

CDP Water Disclosure 2010 Global Report

On behalf of 137 investors with assets of US\$16 trillion



Report written for
Carbon Disclosure Project by:



Carbon Disclosure Project
www.cdproject.net
+44 (0) 20 7970 5660
water@cdproject.net

CDP Water Disclosure 2010

137 financial institutions with assets of over US\$16 trillion were signatories to the CDP Water Disclosure 2010 questionnaire dated April 1, 2010, including:

Aberdeen Immobilien KAG
 AEGON-INDUSTRIAL Fund Management Co., Ltd
 Alcyone Finance
 Allianz Group
 Amundi AM
 APG Group
 Aprionis
 ARIA (Australian Reward Investment Alliance)
 ASM Administradora de Recursos S.A.
 AustralianSuper
 AVANA Invest GmbH
 Aviva Investors
 Bank Sarasin & Co, Ltd
 Banque Degroof
 BBVA
 Blumenthal Foundation
 Boston Common Asset Management, LLC
 British Columbia Investment Management Corporation (bcIMC)
 British Columbia Teachers' Federation Salary Indemnity Fund
 CAAT Pension Plan
 Caixa Econômica Federal
 California Public Employees' Retirement System
 California State Teachers' Retirement System
 California State Treasurer
 Calvert Group, Ltd.
 Canada Pension Plan Investment Board
 Canadian Labour Congress Staff Pension Fund
 Capital Innovations Water Investment Partners
 Catherine Donnelly Foundation
 Cbus Superannuation Fund
 Central Finance Board of the Methodist Church
 Ceres, Inc.
 Christian Super
 Christopher Reynolds Foundation
 CM-CIC Asset Management
 Colonial First State Global Asset Management
 Commerzbank AG
 CommInsure
 Connecticut Retirement Plans and Trust Funds
 Co-operative Financial Services (CFS)
 Corston-Smith Asset Management Sdn. Bhd.
 Daiwa Securities Group Inc.
 DekaBank Deutsche Girozentrale
 Deutsche Bank AG
 Development Bank of Japan Inc.
 Dexia Asset Management
 Domini Social Investments LLC
 Element Investment Managers

Environment Agency Active Pension fund
 Epworth Investment Management
 Essex Investment Management, LLC
 Ethos Foundation
 F&C Management Ltd
 Fédérés Gestion d'Actifs
 First Affirmative Financial Network, LLC
 Five Oceans Asset Management Pty Limited
 Florida State Board of Administration (SBA)
 FRANKFURT-TRUST Investment Gesellschaft mbH
 Fukoku Capital Management Inc
 Fundação Atlântico de Seguridade Social
 Gartmore Investment Management Ltd
 Generali Deutschland Holding AG
 GLS Gemeinschaftsbank eG
 GOOD GROWTH INSTITUT für globale Vermögensentwicklung mbH
 Green Cay Asset Management
 Green Century Funds
 GROUPE OFI AM
 Henderson Global Investors, Sustainable & Responsible Investment (SRI) funds
 Hermes Fund Managers
 HESTA Super
 HSBC Holdings plc
 ING
 Jupiter Asset Management
 KB Kookmin Bank
 KBC Asset Management NV
 KPA Pension
 La Financière Responsable
 Living Planet Fund Management Company S.A.
 Local Authority Pension Fund Forum
 Local Government Super
 Lothian Pension Fund
 Macif Gestion
 McLean Budden
 Mergence Africa Investments (Pty) Limited
 Meritas Mutual Funds
 Mitsubishi UFJ Financial Group (MUFG)
 Mizuho Financial Group, Inc.
 Monega Kapitalanlagegesellschaft mbH
 National Australia Bank
 National Bank of Canada
 National Pensions Reserve Fund of Ireland
 Neuberger Berman
 Newton Investment Management Limited
 NH-CA Asset Management
 Nissay Asset Management Corporation
 Nordea Investment Management
 Norges Bank Investment Management (NBIM)
 Northern Ireland Local Government Officers' Superannuation Committee (NILGOSC)
 Northwest and Ethical Investments L.P.
 Oregon State Treasurer
 Pax World Funds
 Pension Protection Fund
 PFA Pension

PhiTrust Active Investors
 Portfolio 21 Investments
 PSP Investments
 QBE Insurance Group Limited
 Railpen Investments
 Real Grandeza Fundação de Previdência e Assistência Social
 Rei Super
 RLAM
 Robeco
 Robert Brooke Zevin Associates, Inc
 Rockefeller Financial Asset Management Group – SRI Group
 Royal Bank of Canada
 RREEF Investment GmbH
 SAM Group
 Santa Fé Portfolios Ltda
 Schroders
 SEB
 Seligson & Co Fund Management Plc
 Sentinel Investments
 Siemens Kapitalanlagegesellschaft mbH
 SNS Asset Management
 Social(k)
 Sompo Japan Insurance Inc.
 Sopher Investment Management
 Standard Life Investments
 Statewide Superannuation
 Superfund Asset Management GmbH
 Sustainable Capital
 Svenska Kyrkan, Church of Sweden
 Syntus Achmea Asset Management
 The Central Church Fund of Finland
 The Daly Foundation
 The Pension Plan For Employees of the Public Service Alliance of Canada
 The Russell Family Foundation
 The Westpac Group
 Threadneedle Asset Management
 Tokio Marine & Nichido Fire Insurance Co., Ltd.
 Trillium Asset Management Corporation
 Triodos Investment Management
 Union Asset Management Holding AG
 UNISON staff pension scheme
 UniSuper
 United Methodist Church General Board of Pension and Health Benefits
 Vancity
 VicSuper Pty Ltd
 Victorian Funds Management Corporation
 Waikato Community Trust Inc
 Walden Asset Management, a division of Boston Trust & Investment Management Company
 WARBURG - HENDERSON
 Kapitalanlagegesellschaft für Immobilien mbH
 WestLB Mellon Asset Management (WMAM)
 Winslow Management, A Brown Advisory Investment Group
 Zurich Cantonal Bank

Contents

CDP Water Disclosure Signatories 2010	2
Foreword	4
Executive summary	5
Corporate water sustainability in context	8
Sector overview	10
Geographical overview	18
South Africa focus	20
Best practice	24
Sector snapshots	
Chemicals	26
Construction, Infrastructure & Real Estate	28
Food, Beverage & Tobacco	30
Industrial & Manufacturing	32
Metals & Mining	34
Oil & Gas	36
Pharmaceuticals & Biotechnology	38
Retail, Consumer Discretionary & Consumer Staples	40
Technology & Communications	42
Utilities	44
Appendix: Target sample, voluntary responders	46

Foreword

Paul Dickinson, Executive Chairman Carbon Disclosure Project

Demand for water is projected to outstrip supply by a staggering 40 percent by 2030, and an estimated half the world's population are likely to live in areas of high water stress by the same year. The impacts on water resources of population growth, rising per capita demand and climate change are already being felt, albeit unevenly across different sectors and geographies. These impacts will increasingly present risks from physical disruptions to operations and supply chains, changing regulatory regimes and reputational damage from misuse, or perceived misuse, of this shared, life-sustaining resource. But the changing availability of water resources will also present opportunities to business through demand for new infrastructure, products and services. Now is the time to start seizing these opportunities, addressing water challenges and building resilience – not once the well has run dry.

So is water the new carbon? In the sense that water presents an equally pressing challenge to the long term sustainability of business, yes it is, and the need for greater transparency and access to high quality information to inform and improve decision making is just as vital. As companies have repeatedly demonstrated with carbon, what they measure they manage. Thinking about challenges in a strategic way will enable them to mitigate risks and identify opportunities, putting companies in a far stronger position to navigate a water-constrained world than would otherwise be the case.

In other respects water is very different from carbon. Whereas sustainable alternatives to carbon do exist, for water there is no substitute. The challenge therefore lies in managing what we have among competing users, be they businesses, communities or ecosystems. Those competing users or “rivals” (from the Latin for a neighbour who shares a stream) are linked by the geography and politics of their local water systems, making water a local rather than a global management issue, even if its impacts can be felt across the world through the displacement of populations and higher commodity prices.

CDP Water Disclosure's goal is to make meaningful, systematic and comparable reporting on water a standard corporate practice globally, enabling investors, companies themselves, governments and other stakeholders to put this data at the heart of their decision making. More immediately, we seek to raise awareness and enhance understanding of water-related issues, and this excellent report by **Environmental Resources Management (ERM) Ltd** should do just that. We are also delighted to be working with our two lead sponsors, **Molson Coors** and **Norges Bank Investment Management (NBIM)** and with our project sponsor, **Irbaris**, and we wholeheartedly applaud all 175 companies at the vanguard of water disclosure that reported through us in our inaugural year.



Paul Dickinson

Executive Chairman, Carbon Disclosure Project

Executive summary

Introduction

CDP Water Disclosure replicates and builds on the tried-and-trusted methodology and process that the Carbon Disclosure Project (CDP) has used for carbon and climate change since 2003. Backed by 137 institutional investors representing \$16 trillion in assets, this year CDP sent its first annual water questionnaire to 302 of the world's 500 largest companies in the FTSE Global Equity Index Series, focusing on sectors that are water intensive or are particularly exposed to water-related risks.

Although water issues are as unique and varied as their local context, the overarching concern of water management is access: whether the appropriate quantity and quality of water is available for competing human users and for environmental health both now and in the future. The CDP Water Disclosure questionnaire brings insight into the challenges that this presents to companies by requesting information on their water strategies and management plans, on their water-related risks and opportunities, and on their water use within the context of local scarcity or abundance.

This report¹, prepared by Environmental Resources Management Ltd (ERM) analyses the responses to the CDP Water Disclosure 2010 questionnaire. Throughout this report, response rates reflect the full number of responders while all other statistics include only those companies that have chosen to make their responses publicly available. These responses are available to view at www.cdproject.net.

Highlights from 2010 disclosures

The response rate among target companies has been impressive for the program's first year. **Of the 302 target companies, 150 (50%) responded to the questionnaire. A further 25 companies also responded on a purely voluntary basis².**

The strong response rate in this inaugural year is indicative of the high level of importance being placed on water by global corporations across sectors and geographies.

Water has climbed high on the corporate agenda. 67% of responding companies report that responsibility for water-related issues lies at the Board or Executive Committee level, while 89% have developed specific water policies, strategies, and plans. Encouragingly, 60% have set water-related performance targets.

Response rates vary widely between different sectors and geographies. 100% of companies in the Chemicals sector responded compared with just 29% in the Oil & Gas and Construction, Infrastructure & Real Estate sectors. Responses were received from companies in a total of 25 countries, with the highest number of responses coming from the US (59, 57% responding), the UK (14, 64% responding) and Japan (13, 45% responding), and the highest response rates from South Africa (100%), Germany (83%), and Switzerland (71%).

Respondents have a good overall awareness of water risks and water usage within their own operations, but much less knowledge of their supply chains. 96% of responding companies were able to identify whether their own operations are exposed to water risks while just 53% were able to

do so for their supply chains. Sectors reporting the greatest exposure to water risks are Food, Beverage & Tobacco and Metals & Mining, while Chemicals and Technology & Communications report the least. There is a clear opportunity for improvement and focused attention on supply chains in the coming years.

Water is a current, not a future, corporate issue. The immediacy of water as a corporate issue was highlighted by the timescales associated with water-related risks, with more than half of the risks identified across all categories (physical, regulatory and 'other') being classified as either current or near-term (1-5 years), and 39% of companies already having experienced detrimental impacts. These impacts fall into the broad categories of disruption to operations from drought or flooding (in one case resulting in \$100 million in remediation costs), declining water quality necessitating costly on-site pre-treatment, increases in water prices, and fines and litigation relating to pollution incidents.

Corporations are identifying a wide range of water-related opportunities. Even in this early phase of water reporting, 62% of respondents identify significant water-related business opportunities. Widely cited examples include improved water management practices leading to reduced operating costs (e.g. for mines and industrial and manufacturing processes), increasing urbanization and population growth expanding the market for water treatment chemicals (particularly in Asia), and a growing demand for water infrastructure to support growing populations and to adapt to climate change (e.g. flood defense and stormwater systems).

1. Please see the Important Notice on the inside back cover of this report regarding its content and use.

2. The statistics reported only include responses from the 302 targeted companies in order to ensure that subsequent reports compare a similar dataset. Best practice and other elements of the report also draw on the 25 purely voluntary responses received from companies outside the target 302 who are listed in the Appendix.

This report does not rank or score companies either on the quality of their disclosures or on their performance in water management. However, it does contain numerous examples of best practice from a wide range of companies, notably from the likes of **Anglo American, Colgate-Palmolive, Ford Motor, General Electric, PG&E and Taiwan Semiconductor Manufacturing**. These companies, and many others, have recognized the critical nature of water to their business and are taking steps on the journey towards sustainable water management.

Molson Coors Brewing Company commentary

Peter Swinburn, President & CEO

Plentiful, fresh water is what brought John Molson to the banks of the St. Lawrence River in Montreal, Adolph Coors to Clear Creek in Golden, Colorado, and it was the waters beneath Burton-on-Trent that gave birth to the British brewing industry we know today. Water is the #1 ingredient in beer and the quality of our beer is tied directly to the quality of the water we use to produce it. Ensuring fresh water as a sustainable resource is not just part of our heritage, it also plays a vital role in our future.

As a global brewer with over 350 years of experience developing and implementing real-world solutions for water use and conservation, we have learned that solutions to global water issues are often locally based and require individuals, non-profit organizations, and corporations to engage and collaborate in their watersheds and communities. We have also learned that transparency must serve as the cornerstone for stimulating integrated watershed resource management.

Although many companies have increased their knowledge and transparency around operational water use, many still have work to do with respect to water usage across supply chains. At the same time, the cost savings and risk mitigation opportunities inherent in closer evaluation of water use is contributing to even greater focus and action.

We are encouraged that CDP Water Disclosure has received such a strong response from companies in its inaugural year. This is an indication of the growing importance that companies and their investors are placing on water issues. As we enter a new era of increased expectations around water management and reporting, the growing interest that is building behind CDP's efforts is a valuable signal that we are moving collectively in the right direction.

Working with CDP on this issue is a logical next step for corporations that are committed to clean water and water sustainability. It's clear that collaboration and progress require working from the same, reliable information and CDP Water Disclosure is perfectly positioned to normalize best practice and mediate between investors and companies in valuing risks and opportunities. As we move forward, companies must accept the responsibility for their own transparency and join in this effort to help advance what will hopefully emerge as a common water reporting standard benefiting all stakeholders.

On behalf of Molson Coors, I want to congratulate CDP Water Disclosure on a very successful first year. We look forward to exploring new opportunities to encourage and support this critical initiative on behalf of the key stakeholders that have a vested interest in the continued success of companies like ours, as well as the various communities where we operate globally.

Norges Bank Investment Management (NBIM) commentary

Anne Kvam, Global Head of Ownership Strategies

NBIM is responsible for investing the assets of the Norwegian Government Pension Fund Global. NBIM uses its ownership rights to safeguard the fund's assets by promoting good corporate governance and high social and environmental standards at companies it invests in.

As a diversified investor with a long-term outlook and investments in a range of sectors at risk from increasingly scarce water resources, we take water management seriously. Companies that fail to consider the impact of water scarcity and other water-related risks pose a financial risk to investments.

As lead partner in CDP Water Disclosure and with water management as one of our strategic focus areas, NBIM is very pleased with the outcome of the project's first questionnaire. The strong response rate suggests that companies recognise water is a critical issue that needs to be dealt with promptly and adequately. It also indicates that companies understand the importance of disclosing and reporting on their water management. Also encouraging is that many companies see water as a significant area of opportunity.

As expected, many companies have a good awareness of water-related risks in their own operations, but considerably less knowledge about risks in their supply chains. We hope this report will encourage companies to focus more on water management in the supply chain. Sustainable water management is vital for the long-term performance of companies.

“As both the world population and the demand for clean water are increasing, water availability is decreasing in some locations around the world. For its part, Colgate strives to use this natural resource more efficiently and has established water-related goals to ensure we do so. Our strategy is company-wide and applies to all manufacturing and R&D sites around the world.”

Colgate-Palmolive

Irbaris LLP commentary

David Hampton, Managing Partner

Disclosure of environmental risks and opportunities is increasingly important to many stakeholders and it is exciting to see the high level of response to the CDP's inaugural Water Disclosure questionnaire, especially given how events in the past 12 months have demonstrated the devastating social and economic effects of both too much and too little water.

As is made clear in throughout this report, water issues are already creating challenges and opportunities for many businesses. One critical role for disclosure is as a catalyst for change. Corporate actions on water are required on two levels. Clearly, companies should be taking steps to reduce water usage and water-related risks along their supply chain. They also need to consider how the (future) water constrained world could look and what it could mean for customers, suppliers and communities in which the company operates.

Water disclosure is at an early stage and, although rapid progress is being made, much still needs to be done. We fully expect that CDP Water Disclosure will become an essential source of information and insight for internal and external stakeholders to help catalyze companies to take the necessary actions.

Corporate water sustainability in context

“Typically water is a get into business and/or stay in business requirement. The mining industry is dependent on water, and water is a finite resource. With water scarcity scenarios a looming threat, the identified opportunities will enable Anglo Platinum to continue with business-as-usual and enable long-term expansion plans.”

Anglo Platinum

In November 2009, CDP published the results of a Water Disclosure Pilot that was undertaken as part of CDP Supply Chain in 2008. The report noted the growing issue of water scarcity, and highlighted the limited business awareness of the issues, risks and opportunities associated with water. Only half of the respondents viewed water as a significant risk for their business or their supply chain, and the majority of companies focused largely on water management issues in their own facilities.

Since the 2008 Pilot, the focus on corporate water management has been strengthened in a range of ways. Firstly, in the last six to nine months there have been a number of water-related incidents that have served to move the issue up the agenda. **The major floods in China and Pakistan have together resulted in almost \$100 billion in damage to date.** Shares in the Zijin Mining Group were suspended from trading on the Hong Kong stock exchange on October 4th 2010 in advance of disclosure of the penalties and clean-up costs associated with the 2.4 million gallon acid spill into the Ting river in July 2010. The Ajka aluminium waste spill in Hungary has now reached the Danube, having extinguished all life from the Marcal river. Widespread drought conditions in China, Argentina, Russia and New Zealand have hurt profits in the agricultural and hydroelectric sectors. The business impacts of water issues are becoming increasingly evident.

In addition, there has been a recent focus on the notion and formalization of water rights, evidenced by the declaration in July 2010 by the United Nations General Assembly that clean water and sanitation are a fundamental human right. The declaration received a large amount of publicity and has increased the salience of water access as an international political issue, illustrated by the Stockholm Statement that emerged from World Water Week, and discussions around water in the context of funding for climate change adaptation in advance of COP16 in Cancun at the end of November 2010.

There is also growing evidence of broader corporate understanding of the water issue in terms of the formalization of the link between water and energy (or the “water-energy nexus”). The increasing focus on “unconventional petroleum” sources such as oil shales, tar sands and coal seam gas, which require significant water inputs during extraction and production and can also lead to the discharge of significantly polluted wastewaters, is a case in point. Global Water Intelligence for example estimated that it takes 11 barrels of water to transport and separate each barrel of bitumen from Canadian tar sands².

1. The statement urged the high-level Plenary Meeting on the Millennium Development Goals to “act upon the fundamental roles of water resources, drinking water, sanitation and water for all” Stockholm International Water Institute, 2010. <http://www.siiwi.org/sa/node.asp?node=1044>
2. Global Water Intelligence, 21st January 2010. www.globalwaterintel.com/insight/how-can-we-meet-oils-growing-demand-water.html.

The response of the corporate sector to these various developments has been varied, as demonstrated by the 2010 CDP Water Disclosure responses, but it generally recognizes the **increasing importance that water plays in an organization's "license to operate", particularly in areas that are water-stressed or that are likely to become so.** Widespread business support for the various corporate water initiatives that have emerged in the recent past is a clear indicator of this growing corporate interest in current approaches to water sustainability. The work of organizations such as the CEO Water Mandate, the Alliance for Water Stewardship, and the newly upgraded WBCSD Water Project are helping to place business at the centre of the global response to the problem of water scarcity. The corporate response to water management has also led to the emergence of more in-depth methodologies for measuring and understanding organizational water use.

Businesses are increasingly realizing that it is no longer sufficient to simply gather and report on water usage and discharge volumes, but that there is an additional need to further characterize this water usage, by understanding both the geography of usage, the nature of water sources and the scale of overall impacts resulting from abstraction and discharge. **This is most comprehensively achieved through the process of water footprinting, which allows a comprehensive assessment of water usage across a company's operations within a defined scope.**

The concept of water footprinting emerged in the early 2000's from the work of Arjen Hoekstra at UNESCO-IHE and has been the subject of much discussion from a corporate perspective. While there have been controversies over the specifics of the process, the establishment of an ISO working group for the development of a water footprinting standard may herald progress. This working group seeks to establish a methodology which will **allow users to understand the water process more fully, identify the reduction "pressure points" within the process, and ensure the comparability and accuracy of the footprints.**

Whilst progress in water accounting/ water footprinting has been uneven, a concept that has received significant growing support within the last year is that of "water stewardship". The water stewardship concept seeks to **broaden the focus of corporate water sustainability away from simply quantifying water use volumes, to the active promotion of responsible water usage.**

Championed globally by the Alliance for Water Stewardship the concept is aimed at creating "a program that recognizes and rewards water users and managers who take major steps to minimize the impacts of their water use and management".

The Carbon Disclosure Project's launch of CDP Water Disclosure marks another significant milestone towards improved corporate water management. The program is building on an extremely effective blueprint, and the high level of engagement from companies in this inaugural year suggests that it is well placed to serve as a driver for improved water measurement and management and the global dissemination of best practice relating to water, and to provide a reservoir of data and knowledge to inform decision making by investors, companies, governments and other stakeholders in the coming years.

"Climate Change and global warming could reduce snow pack and runoff volumes needed to support Hydro electric generation. This, in turn, is likely to raise the cost of energy production. Those costs could have a direct impact on the financial bottom line for the company."

Air Products and Chemicals

Sector overview

“Industries need clean, abundant, secure, and competitively priced sources of water and have a responsibility to the public debate on water policies that affect industries.”

Caterpillar

Introduction

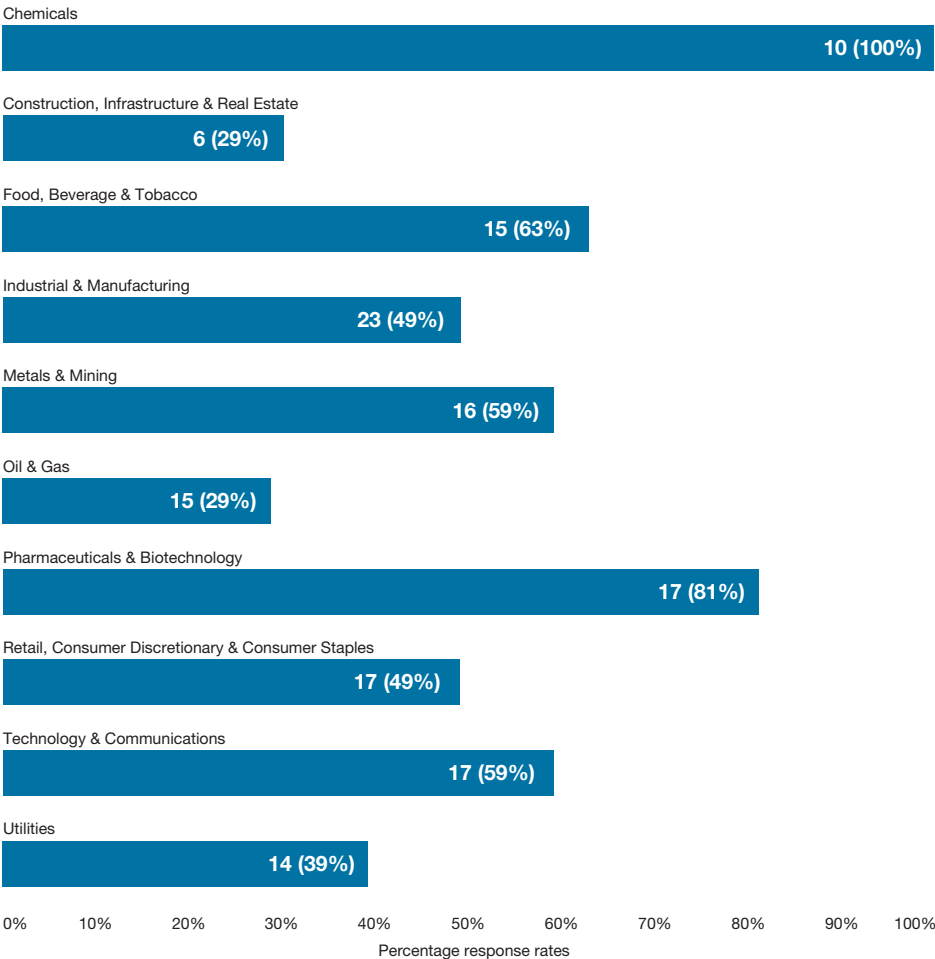
There has been an impressive response to the program’s first questionnaire, with 150 (50%) of the target sample of 302 companies responding. Of these, a very creditable 122 (81%) chose to make their responses publicly available. Throughout this report, response rates reflect the full number of responders while all other statistics include only those companies that have chosen to make their responses publicly available.

In addition, 25 companies from outside the target sample responded on a purely voluntary basis. These companies are not included in the statistical analysis but examples of best practice and other elements of the report draw on their responses.

Sector response rates

A sector-by-sector comparison provides an insight into the particular challenges and opportunities each sector faces and the extent to which they are taking action. Certainly, response rates varied widely across sectors, with the rates for Chemicals (100%) and Pharmaceuticals & Biotech (81%) in stark contrast to those for Oil & Gas (29%) and Construction, Infrastructure & Real Estate (29%). Given the importance of water to these sectors, and their potential impacts on water supplies, a greater commitment to reporting would be desirable.

Fig. 1: Number of responding companies and response rates by sector



Water targets and goals

Water is already high on the corporate agenda with 67% of respondents reporting responsibility for water-related issues at the board or executive committee level, and 89% already having developed water policies, strategies or plans. Encouragingly, 60% of respondents disclosed concrete performance goals - which are essential to improving water management - for a range of indicators including reductions in use, quality of discharges, sustainability of supply (including river management), provision of safe drinking water to local communities and community engagement. As illustrated in Figure 2, Food, Beverage & Tobacco (100%) are clear leaders while Oil & Gas (8%) perform particularly poorly.

The number of companies reporting absolute targets for water reduction or water efficiency targets is notable. Slightly more companies reported absolute targets (36) than efficiency targets (33), which is encouraging given that the former are generally more onerous and are considered best practice, particularly in water-stressed regions. In many cases companies reported both absolute and efficiency targets, which is why for sectors such as Food, Beverage & Tobacco the combined number of companies reporting these targets (14) in Figure 3 exceeds the number of companies reporting any target (12) in Figure 2.

"In 2009, GE's water use was 10.7 billion gallons, a 30% reduction from 2006."

General Electric

"Our goal is to reduce our Group freshwater use per tonne of product by six per cent by 2013 from a 2008 baseline."

Rio Tinto

Fig. 2: Number of companies setting any water-related target

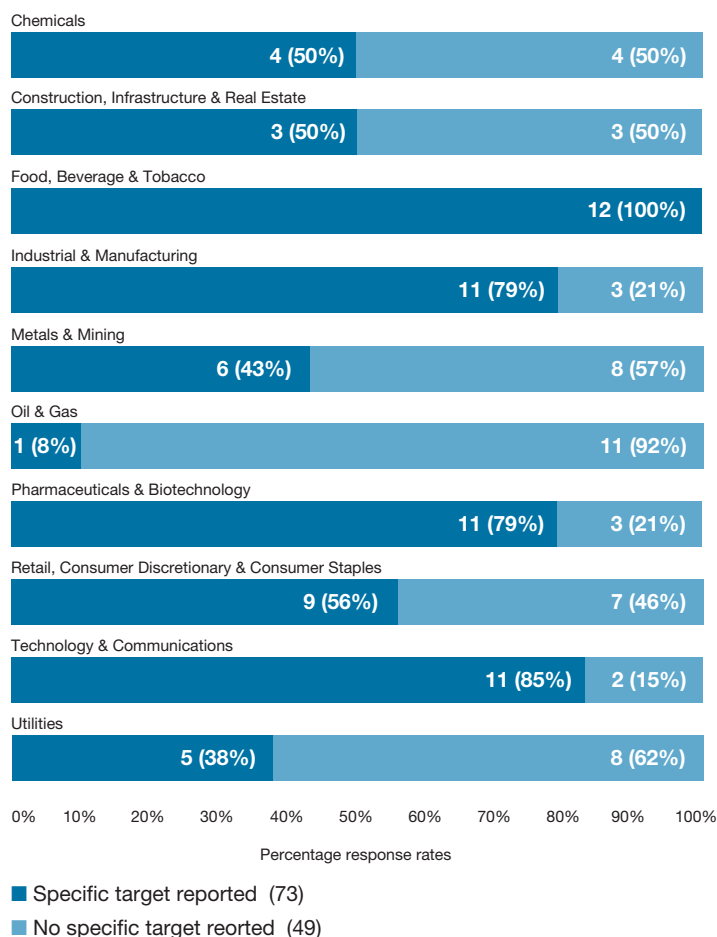
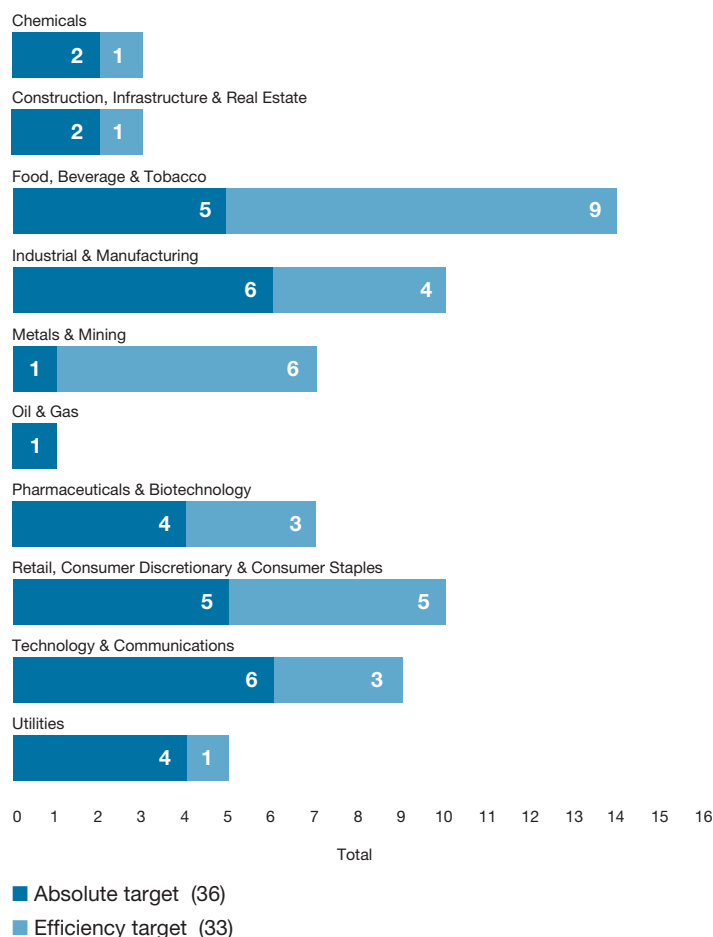


Fig. 3: Number of companies setting absolute reduction and efficiency targets



“Recent investments have had to be made to improve water security following a water supply shortfall identified in 2004 for the Sasol Secunda Operations in South Africa. A R2.7billion Vaal River Eastern Sub-system (VRESAP) pipeline project, in which Sasol has a 40% share, has been commissioned and will provide an additional reliable supply of water from the Vaal Dam to both the Sasol Secunda operations and for use by the electricity utility Eskom.”

Sasol

“Motorola conducts routine risk assessments to identify high-risk situations that could adversely affect our operations. Our crisis teams have developed preparedness plans to ensure that our response will be effective and our recovery swift.”

Motorola

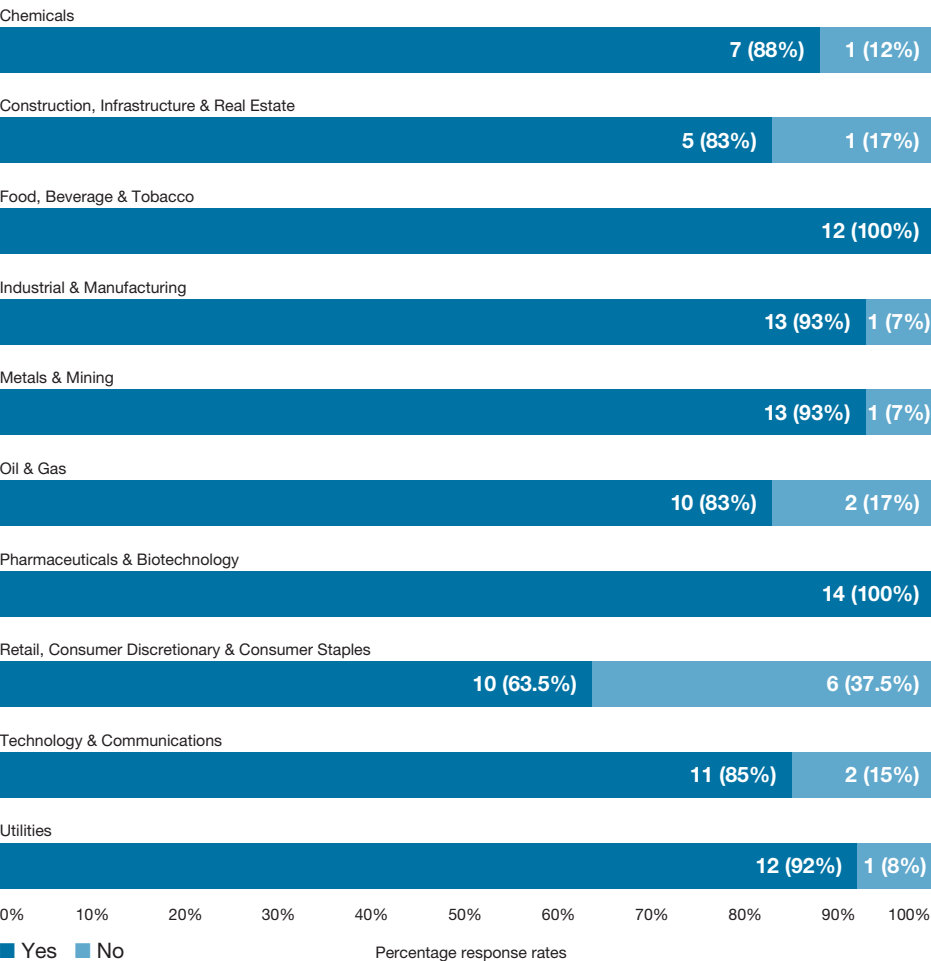
Exposure of companies’ own operations to water stress

Overall, an impressive 88% of companies are able to identify which of their operations are located in water-stressed areas, signaling a high degree of awareness of the significance of water to continuing operations. Retail, Consumer Discretionary & Consumer Staples (63%) scored notably less than average and would be advised to map the exposure of their sites to water stress.

Identification of risks in own operations and supply chains

- Companies face numerous water-related risks and for the purposes of the questionnaire they are broken down into three categories:
- ‘physical risks’ including exposure to water stress, flooding and pollution;
 - ‘regulatory risks’ including higher tariffs, the redistribution of water rights and more stringent regulations governing water quality; and
 - ‘other risks’ including reputational risk (harming the corporate brand), infrastructure risk (disrupting operations), and product risk (felt through decreased demand for water-intensive products).

Fig. 4: Companies able to identify whether their own operations are located in water-stressed regions



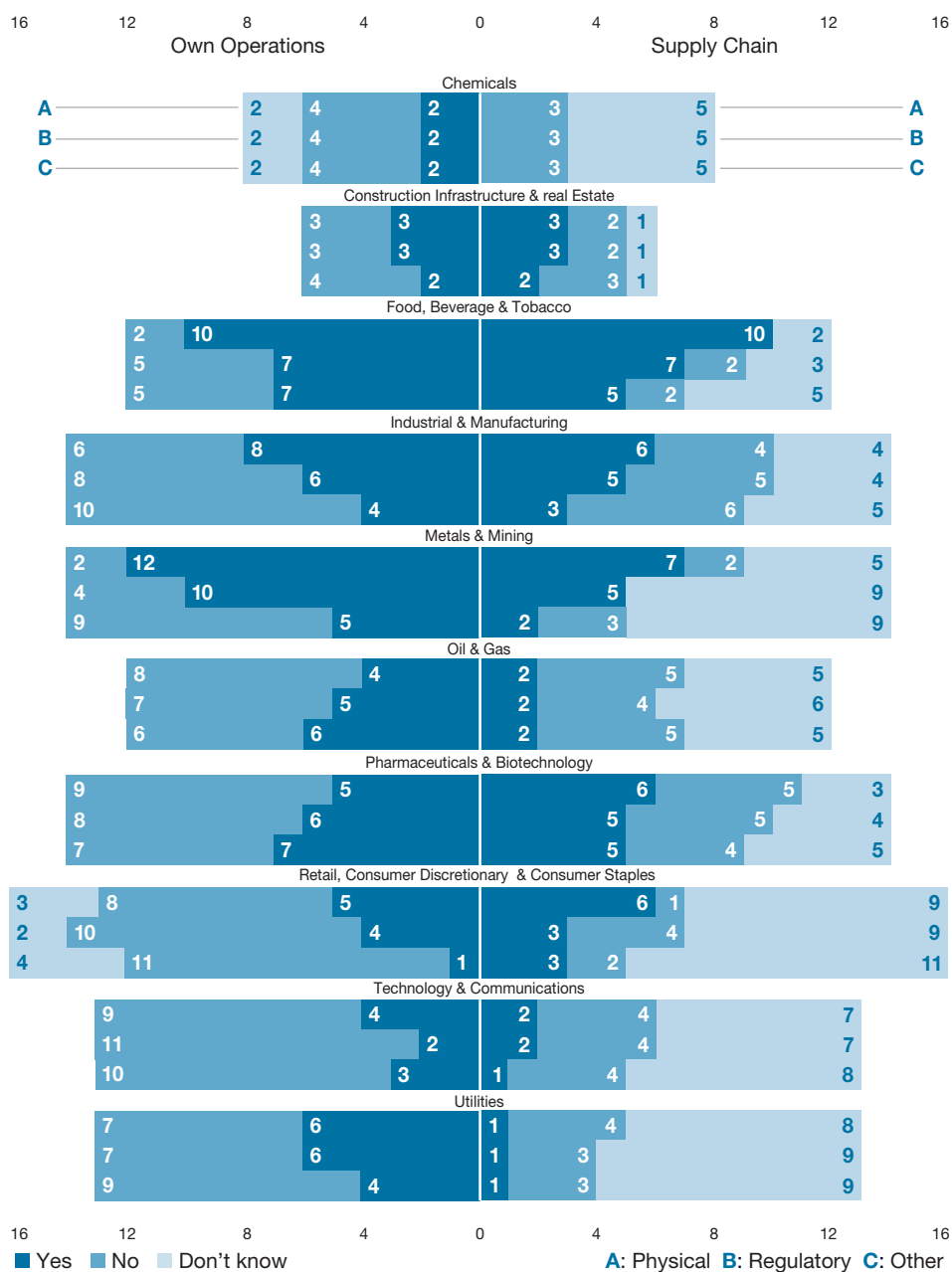
In general, respondents reported a good awareness of the water-related risks to their own operations, with just 4% unable to identify whether they are or are not subject to such risk. Companies in Food, Beverage & Tobacco (81%) and Metals & Mining (81%) were most likely to report exposure to physical risks, while those in Chemicals (20%) and Technology & Communications (31%) were least likely to. Similar patterns were also exhibited for regulatory and other risks.

Perhaps unsurprisingly given its newness as an area of management focus, 47% of respondents were unable to identify whether their supply chains are subject to water-related risk. For many sectors, including all those connected with agriculture, supply chains are central to understanding and managing water risk. Such risk can be mitigated through risk mapping and assisting and encouraging suppliers to reduce their own water footprints, but according to disclosures, such practice is not yet commonplace. Companies would be well advised to remedy this.

"To grow our business sustainably we need to reduce the total amount of water used across our value chain, especially in regions where water availability is already under pressure from climate change."

Unilever

Fig. 5: Risks reported for own operations and supply chains



“We promote water conservation with our suppliers. We routinely ask suppliers about their conservation programmes when we issue requests for proposal, as well as their overall environmental, safety and health performance.”

AEP

Water withdrawals, reuse and recycling

While 86% of respondents disclosed the total volume of water that they withdraw, only 64% provided a breakdown of this figure (giving it either geographical or organizational context), and only 42% provided a figure for recycling and reuse. Overall, Metals & Mining had the highest reporting rate and Utilities and Oil & Gas the lowest. Clearly, there is still work to do in terms of reporting basic water metrics, though part of the problem unquestionably lies with the lack of a standard measuring and reporting methodology.

While one respondent repudiated the mantra “you can’t manage what you don’t measure”, accurate measurement allows the methodical identification and implementation of water-saving methods, as well as the accurate tracking and reporting of progress, and should sensibly form an integral part of all water management programs.

Fig. 6: Proportion of companies reporting figures for withdrawals and reuse/recycling

	Provided figure for total withdrawal	Withdrawal figure broken down by geography etc.	Provided figure for recycling/reuse
Chemicals	88%	88%	38%
Construction, Infrastructure & Real Estate	100%	100%	33%
Food, Beverage & Tobacco	92%	58%	33%
Industrial & Manufacturing	93%	64%	36%
Metals & Mining	100%	86%	79%
Oil & Gas	50%	42%	33%
Pharmaceuticals & Biotechnology	100%	71%	50%
Retail, Consumer Discretionary & Consumer Staples	81%	63%	25%
Technology & Communications	100%	69%	58%
Utilities	62%	23%	23%
Totals	86%	64%	42%

Detrimental impacts from water already suffered

Water is not just a concern for the future but is quite clearly a current issue which is biting companies already. A highly significant proportion of respondents (39%) report that they have suffered detrimental impacts from water in the past five years, with Metals & Mining (64%), Utilities (62%) and Chemicals (50%) worst affected. These detrimental impacts fall into the broad categories of disruption to operations from drought or flooding (in one case resulting in \$100 million in remediation costs), declining water quality necessitating costly on-site pre-

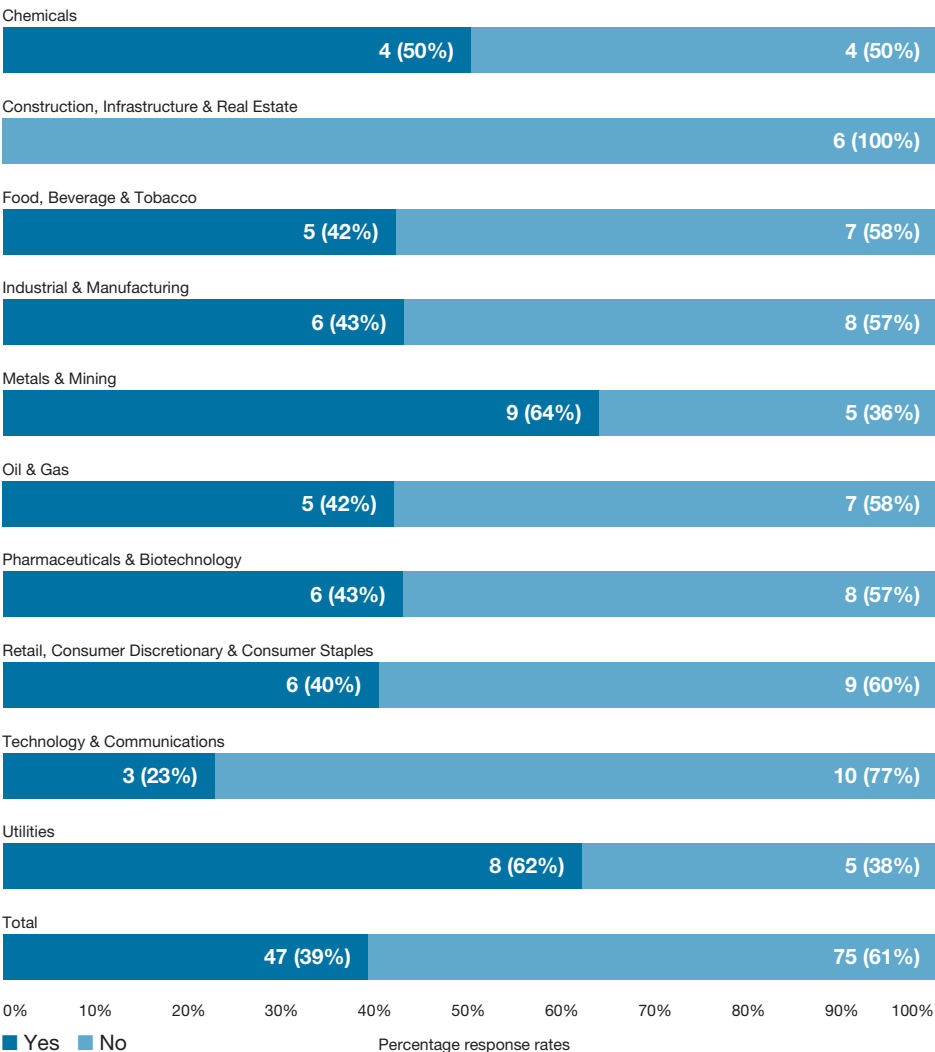
treatment, increases in water prices, and fines and litigation relating to pollution incidents.

The immediacy of water as a corporate issue was further highlighted by the timescales associated with water-related risks, with more than half of the risks identified across all categories (physical, regulatory and other) being classified as either current or near-term (1-5 years).

“Extreme weather events such as hurricanes or flooding can ... require a shut-down of our plants or hamper normal operations. This is associated with production losses, not only in terms of production being temporarily stopped, but also in terms of the transport of raw materials and products by ship.”

BASF

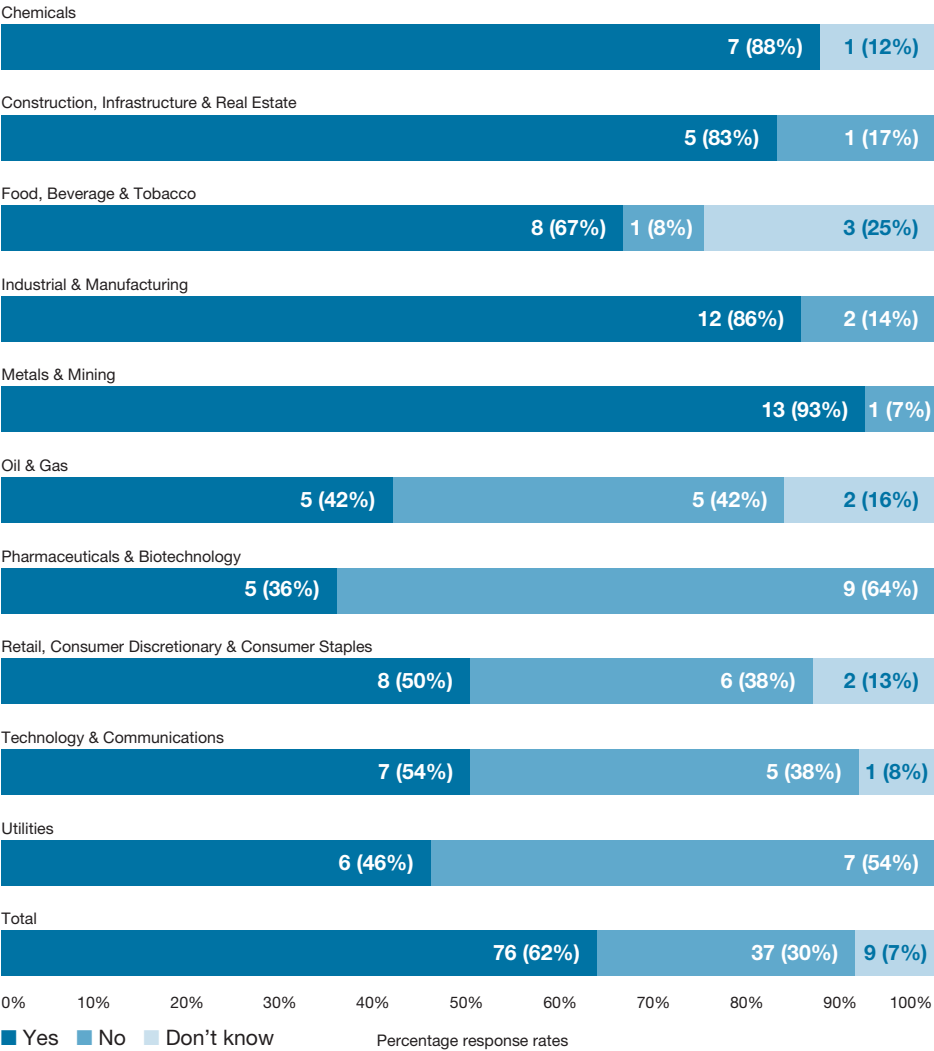
Fig. 7: Companies reporting having suffered detrimental impacts from water



“Air Liquide has developed several solutions for water treatment in the fields such as gas to liquid transfer, activated sludge oxygenation of oxidation processes. Water treatment is getting more and more important.”

Air Liquide

Fig. 8: Companies identifying water as an opportunity



Water as an opportunity

Perhaps the most encouraging theme arising from the disclosures is that 62% of respondents already recognize the opportunities that water presents. Sectors reporting the greatest opportunities are Metals & Mining (93%), Chemicals (88%), and Industrial & Manufacturing (86%). Examples include improved water management practices leading to reduced operating costs (e.g. for mines and industrial and manufacturing processes), increasing urbanization and population growth expanding the market for water treatment chemicals (particularly in Asia), and a growing demand for

water infrastructure to support growing populations and to adapt to climate change (e.g. flood defense and stormwater systems).

While the financial savings from better water management may be dwarfed by revenues, they impact directly on a company's bottom line and can thus be a powerful lever for improving profitability. Companies' appreciation of this may have arisen from their experience with carbon management or from a more general appreciation of the business case for sustainability. Companies are already seeing a range of benefits from stronger balance sheets to the ability to attract

and retain top talent as a result of reputational strength, and these are likely to become more pronounced as water challenges intensify.

Recognition of the energy-water nexus

It is also encouraging that 72% of respondents, including at least 50% respondents from each sector, have identified linkages and tradeoffs in their management of water and energy. Reductions in the use of water often – but not always – result in reductions in the use of energy. The widespread recognition of this

fact stands companies in good stead as they construct resource efficiency management plans that reflect the interdependence of various inputs, and the opportunities for savings in multiple areas through single projects.

“Climate change and energy are inextricably linked. Water issues must be framed in the wider context, including issues of material efficiency; availability of safe, clean water and sanitation; reducing travel and transport; supply chain accountability; healthcare innovation; and infrastructure improvement.”

Astra Zeneca

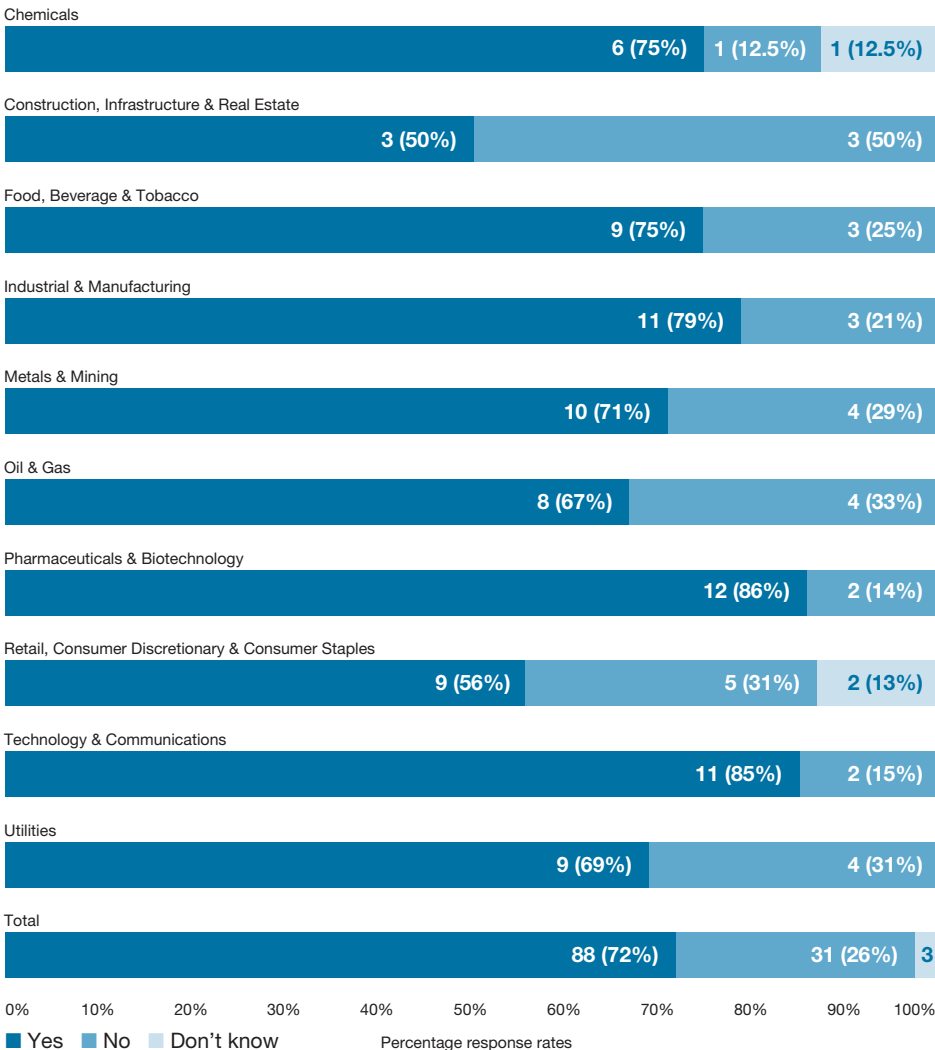
“We fully understand the linkage between water and energy. As a power generator, AEP uses large quantities of water to produce electricity. New technologies being developed, such as carbon capture and storage, will also require large amounts of water. These are issues we will have to address.”

American Electric Power Company

“Devon is constantly reminded and aware of the fact that there is a close linkage between energy production and water. Our business economics and production potential are often interrelated to the volume of produced fluids that ultimately must be disposed of. If our ratio of produced water to energy yielded begins to increase, operating costs may increase to a point in which a well may become uneconomic to produce.”

Devon Energy Corporation

Fig. 9: Companies identifying linkages between the management of water and energy



Geographical overview

The target sample comprises 302 companies from a total of 34 countries with responses received from 25 of these. There is a heavy weighting towards the US which accounts for 35% of the total sample and 39% of the responses received, with 59 responses and a 57% response rate. The next best represented countries are the UK with 14 responses (a 64% response rate), Japan with 13 (a 45% response rate) and Germany with 10 (an 83% response rate). All South African companies in the target sample responded, with Germany (83%) and Switzerland (71%) also achieving particularly strong response rates.

The nine countries with companies included in the target sample from which there were no responders are Chile, Czech Republic, Malaysia, Mexico, Norway, Poland, Russia, Singapore and Thailand.

Fig. 10: Number of responding companies and response rates by country

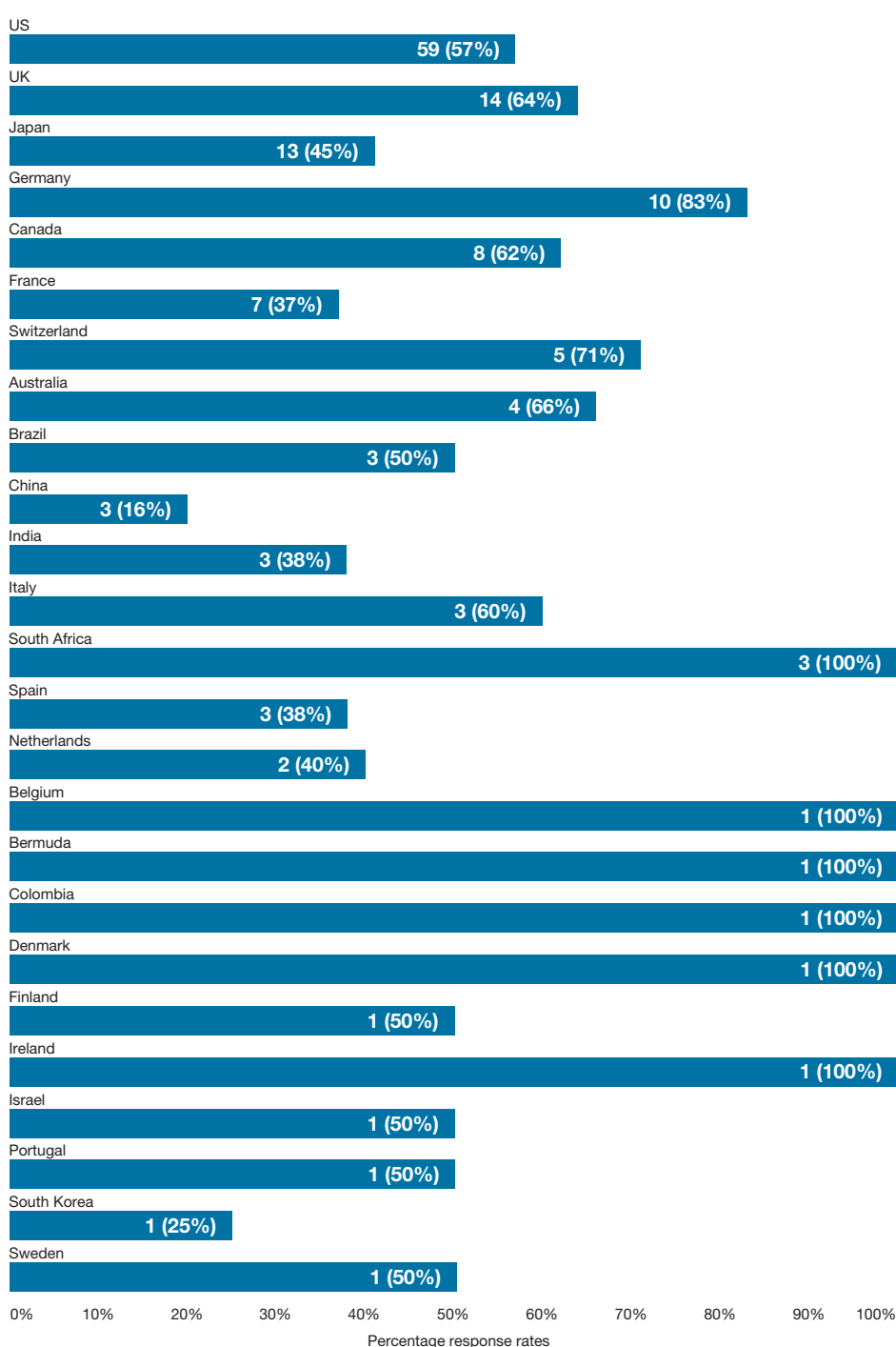
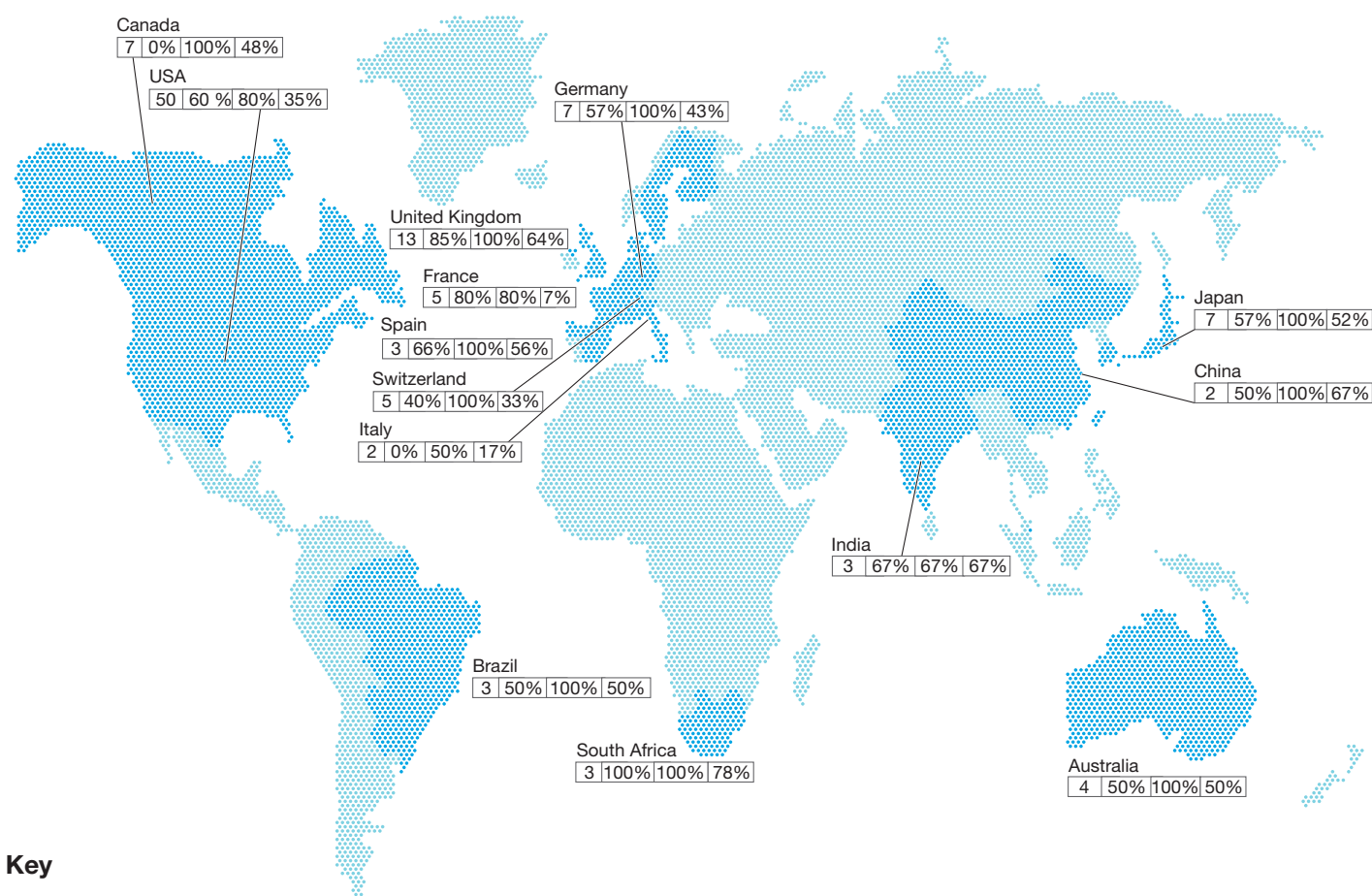


Figure 11 highlights key statistics on the management of water and exposure to risk for each country represented by more than one public respondent. It focuses on the number of respondents, the proportion that has set targets, the proportion able to identify whether their operations are located in water scarce regions, and the proportion reporting

that their own operations are exposed to water risk. South African and UK companies lead in setting performance targets and in their ability to identify whether their operations are located in water stressed regions. Interestingly, companies from these two countries and India were most likely to report water-related risks to their operations.

Fig. 11: Key facts by geography



Key

A B C D

- A** Number of public respondents
- B** Percentage setting efficiency or quality targets
- C** Percentage able to identify whether their own operations are located in water stressed areas
- D** Percentage identifying risks to their own operations (average of physical, regulatory and other risks)

South Africa focus

South Africa's available freshwater resources are already almost fully-utilized and under stress. At current projected population growth and economic development rates, it is unlikely that the growth in demand for water resources in South Africa can continue to be met. Water thus has the potential to become the limiting resource to the country's economic development. This section examines South Africa's water resources, how they might be affected by climate change, the legislative context, and how business in South Africa is beginning to respond to the challenge.

Water in context – how does South Africa fit into the global water picture?

South Africa is an arid country with only 8.6% of annual rainfall becoming available as surface water, one of the lowest conversion ratios in the world. This runoff is unevenly distributed both geographically and over time, with great annual variability in rainfall. South Africa's groundwater resources are also relatively limited compared to global averages.

This water scarcity and unpredictability is compounded by the pollution of surface- and ground-water resources by industrial effluents, domestic and commercial sewage, acid mine drainage, agricultural runoff, and litter.

The country's total renewable water resource is 1,048 m³ per person or about 13% of the global average of 8,210 m³ per person. A country is said to experience "water stress" when annual water supplies drop below 1,700 m³ per person. When this level falls to between 1,700 and 1,000 m³ per person, periodic or limited water shortages can be expected. When annual water supplies drop below 1,000 m³ per person, the country faces water scarcity. Coupled with this, South Africa uses about 25% of its renewable freshwater resources per annum, with use in excess of 10% typically seen as a cause of water stress in a given locality.

Water resources are amalgamated into 19 Water Management Areas (WMAs) across the country. A significant amount of water is transferred between these WMAs and also from South Africa's neighbors. Inter-Basin Transfer (IBT) of water has long been seen as the solution to water scarcity in South Africa, and of the nine provinces whose water supplies are bolstered by transfers, eight are reliant on IBT for more than 50% of their annual supply. It has been reported that Gauteng Province, which supports around 25% of South Africa's population and generates around 10% of the economic output of the entire African continent, is 100% reliant on IBT for its water supply.

South Africa is looking to other countries such as Lesotho to help meet its projected demand for water, though there are clearly risks associated with dependence on extra-territorial supply of arguably the key national resource.

How exposed is South Africa to climate change?

Although the overall impact of climate change on water resources is uncertain and will vary significantly from region to region, evidence suggests that average temperatures in South Africa will rise and rainfall patterns will change. These changes are likely to result in greater evaporative losses from dams and soils, and a greater risk of algal blooms. Reduced freshwater flow in rivers will also reduce the size of estuaries and be harmful to their ecosystems (and therefore the populations that rely on them), and will reduce the dilution of wastewater discharged into rivers. This, in turn, will increase the already intense pollution in the coastal zone.

Recent studies have shown that South Africa could face a water supply gap of between 17% and 25% by 2030 assuming that water withdrawal for irrigation does not increase. South African agriculture and municipal water supplies are highly dependent on rainfall, but current models indicate that climate change will lead to lower average rainfall and a reduction in water availability of approximately 10%. Given the importance of South Africa's agricultural sector to food security in Southern Africa, any reduction in rainfall could have serious implications for the region. South Africa is clearly highly sensitive to climate change impacts, and management of the existing supply will be key to mitigating the impacts of rising temperatures.

1. The Market as a Driver or Constraint in the Move Towards Renewable Energy in Southern Africa, Touchstone Resources, July 2009.
2. Inland Water: Background Research Paper produced for the South Africa Environment Outlook report on behalf of the Department of Environmental Affairs and Tourism, SRK Consulting, October 2005.
3. Nedbank Sustainability Outlook, Edition 1, Nedbank, August/September 2010.
4. The Market as a Driver or Constraint in the Move Towards Renewable Energy in Southern Africa, Touchstone Resources, July 2009.

What is the legislative framework around water in South Africa?

Since 1994, there has been significant progress in the development of South African policy and legal frameworks regarding water resources. The National Water Act stipulates that the government is the trustee of the nation's water resources and that it must act in the public interest to ensure that water is "protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner for the benefit of all persons". It also recognizes the limits to the proposed solutions of constructing new dams and increasing water transfer, and strongly advocates demand management approaches. Finally, the act makes a provision for a "reserve" of water "to protect the ecological functioning of aquatic ecosystems before water uses such as industry or agriculture can be authorized".

South Africa's main approach to addressing water issues is one of integrated water resource management. A key principle of this is the need to balance protection of water resources with social and economic development, and the only two guaranteed entitlements to water are for the ecological reserve and to meet basic human needs.

South African companies' responses to CDP Water Disclosure

The South African response to CDP Water Disclosure has been extremely positive, with all six of the 302 target companies listed on the Johannesburg Stock Exchange submitting responses, and a further six South African companies responding on a purely voluntary basis. The fact that almost a quarter of all voluntary submissions have come from South Africa indicates how seriously the issue is felt. Of these 12 companies, eight responded publicly and are included in the following analysis.

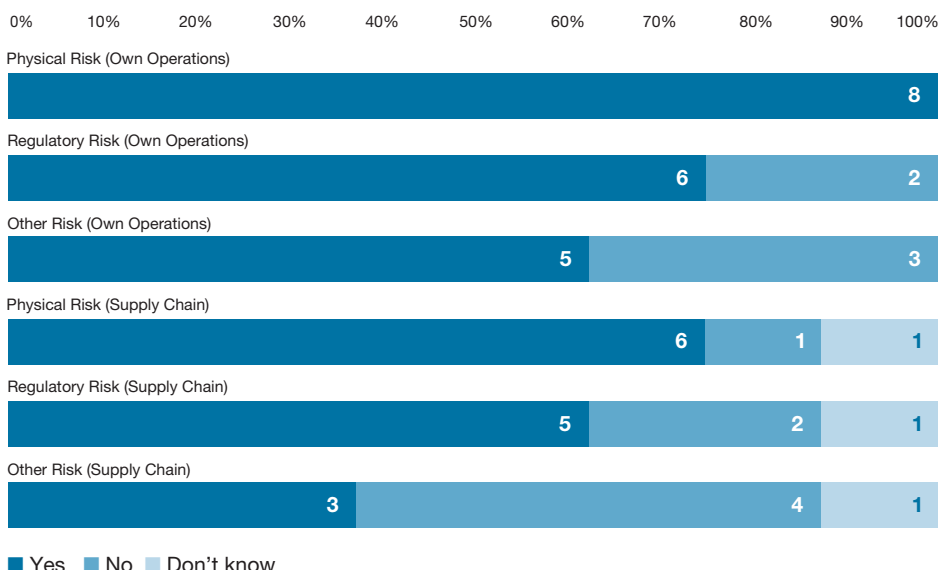
The following companies either register themselves as South African in the response, or are listed on the Johannesburg Stock Exchange:

Companies from target sample	Volunteers
Anglo American	Eskom
Anglo Platinum	Exxaro Resources
AngloGold Ashanti	Impala Platinum
British American Tobacco	Nedbank
SABMiller	Northam Platinum
Sasol	Woolworths Holdings

All eight publicly responding companies (shown in blue above) reported that their own operations are susceptible to significant physical risks (compared to 48% of global respondents). Six (75%) also reported significant physical risks to their supply chain (compared to 35% of global respondents), illustrating that the vulnerability is widespread and acknowledged by procuring companies.

This vulnerability is further reflected by the fact that all but one company (88%) reported having suffered a detrimental impact from water in the last five years (compared to 39% globally). These impacts include flooding, water shortages leading to power cuts and interruptions to supplies of key inputs.

Risks Identified



“In March 2009, we launched The Anglo Environment Way (AEW), which sets out a consistent approach to responsible environmental management, supporting our vision for minimizing harm to the environment by designing, operating and eventually closing all of our operations in an environmentally responsible manner. The Anglo Environmental Way includes 10 performance standards, which apply to all managed activities across the world. One of these is a Water Performance Standard.”

Anglo American

However, the challenging environment facing South African companies has prompted a stronger response than seen elsewhere. All of the respondents have a water policy, strategy or management plan which falls under the direct oversight of the board or a subset thereof. Further, 88% of respondents have set a specific water target (compared to 59% globally), although all but one of these targets is efficiency related and none seeks the absolute reduction in water use that will be vital to the successful management of the country’s water resources. Nevertheless, the indication is that South African companies are alert to water challenges and are putting in place the necessary management structures.

It is clear that South African companies are evaluating water risks with an eye to extracting the opportunity as 88% identify water-related opportunities (compared to 62% globally). In South Africa, these opportunities range from infrastructure improvement projects to increased recycling and wastewater reclamation in mining operations.

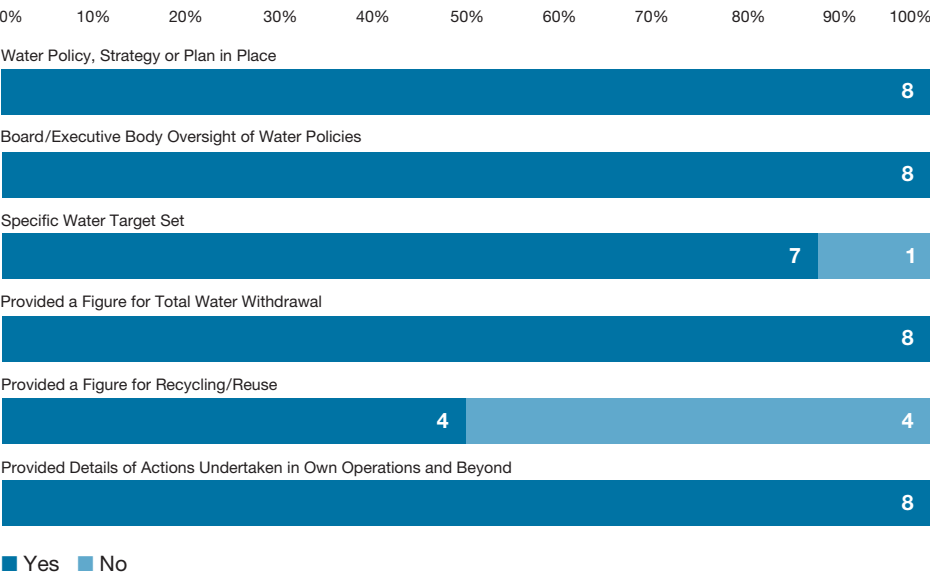
“Our water strategy is based on the 5Rs (pRotect, Reduce, Reuse, Recycle and Redistribute), a comprehensive, risk-based approach to managing water in our business and in the value chain. This model provides a consistent approach, recognizing the different local issues and circumstances faced by each of our businesses.”

SABMiller

“Northam endeavors to run a zero discharge operation and closely monitors any potential impacts of its operations on surface and groundwater sources.”

Northam Platinum

Response Summary



ERM's view on how South African companies should be thinking about water management

The current and future challenges in South Africa with regard to water are clear, and the earlier action is taken, the more positive an effect it will have. Forward thinking companies in South Africa should be considering the following with respect to water management:

1. Developing an accurate water consumption baseline against which future performance can be measured
2. Mapping out risks and vulnerabilities with regards to water supply and quality both at the site level and in the supply chain
3. Instituting measures and incentives to drive efficient use of water not only in own operations but in the communities where they operate
4. Pricing water effectively into capital expenditure programs, incorporating the current and future costs of withdrawal into accounting processes
5. Engaging with community and governmental stakeholders around water management issues, identifying opportunities for knowledge transfer where possible/feasible
6. Building adaptive capacity with regard to the physical impacts of climate change, for example by building aqueducts
7. Seeking opportunities to work collaboratively with other companies and through partnerships with other stakeholders over water management and R&D, in order to help mitigate the impacts of water scarcity and strengthen the reputation of the company in a highly scrutinised market.

The scale of the challenge is only starting to become clear, and as it does so the need for action will become more pressing. Companies with operations in South Africa would be well advised to begin work on adaptation and mitigation strategies before negative business and social impacts begin to tell, not only to safeguard business interests but also those of the South African people who share a highly stressed water supply.

Water stress in South Africa will not disappear. There is no magic fix. South African companies can reduce the burden on the existing supplies by starting to implement best practice measures in their business. Part of this is accurate and comprehensive reporting, not only to disclose withdrawals and recycling rates, but also to share good practice, enhance reputation, and signal to investors and other stakeholders that this vital issue is being well managed. We applaud the respondents for pioneering this initiative in South Africa and encourage more extensive participation from the JSE 100 for whom water is a material issue.

“We will continue to ensure that our business and supply chain activity conserves our precious water resources. This effort is an important part of our commitment to sustainable business practices and forms part of our Good business journey – our long term plan to help people and planet.”

Woolworths Holdings

Best practice

“Customers are increasingly aware of environmental issues and as a provider of leading information it is incumbent upon us to show good practice. Although not a consumer-facing company, our reputation is extremely important if customers are to have faith in the information we provide.”

Reed Elsevier

Responses to the questionnaire have highlighted a variety of best practices that can be adopted across sectors to assist companies in managing their water risks, as well as unlocking business value through process improvement and the development of market offerings. The responses have been highly encouraging, and respondents would be advised to carry this momentum forward as the challenge intensifies.

Governance and policy

- Board or executive committee responsibility for water to reflect its strategic importance in water-intensive sectors.
- Responsibility for site and regional water use assigned, with responsible person(s) required to identify local risks, opportunities, and reduction opportunities in order to ensure management systems reflect the local water dynamics.
- Specific target setting in terms of absolute reductions at the corporate level, but formulated based on reasonable and achievable local targets, as well as existing resource efficiency/reduction programs.

Supply chain assessment and awareness building

- Completion of annual water-risk mapping of Tier 1 suppliers.
- Ongoing direct engagement of procurement teams (or other company team) with Tier 1 suppliers to assist them with water management.

Active investigation of and investment in new technologies and approaches

- Implementation of site-level daily/weekly water metering technologies.
- Business-case assessment of low water-use technologies, wastewater treatment and recycling methods as part of a comprehensive resource efficiency plan.
- Required investment return rates for efficiency projects to reflect all financial and non-financial water risks and opportunities.

Stakeholder collaboration and communication

- Proactive involvement in local and regional water issues at the community, NGO and government levels, including communicating water reduction practices to the local population.
- Active participation in business and investor groups and initiatives regarding water, such as the Dow Jones Sustainability Index, the Global Reporting Initiative, the UN CEO Water Mandate and the WBCSD Water Working Group.

Anglo American

Anglo American and its subsidiaries continue to minimize water use throughout their operations. Major strategies include replacing water with air in cooling systems, increasing on-site reuse, underground mine water recycling, environmentally friendly dust suppressants and increased water efficiency in tailings transport systems. This has allowed many mine sites to become independent from water sources and increase water available to local communities. Anglo Platinum in particular has committed to the ambitious goal of 'zero potable use' and decreased its potable water use in 2009 by 13%.

Colgate-Palmolive

Having reduced absolute water use by 29.8% between 2002 and 2009, Colgate-Palmolive are seeing the benefits of a comprehensive company-wide focus on water management. Through the implementation of reduction and efficiency opportunities at the site level, internal company expertise has expanded rapidly, with 82% of companies reporting the implementation of more than 150 measures to reduce water consumption. Demand management through site-level commitment to water reductions has led to significant benefits, and will continue to do so as Colgate-Palmolive work to meet their next absolute reduction target that will be set this year.

Ford Motor

Since the launch of Ford's Global Water Conservation Initiative in 2000, water use in the company has fallen by 62.4%, and the company's data management processes regarding water are sector-leading. Environmental management is a key performance indicator at each site, and all levels of management up to the Group VP of Management and Labour Affairs are assessed at the year end on their progress towards previously set targets regarding environmental performance.

General Electric

With the installation of high-tech metering systems (GE Sensing Ultrasonic flow meters) among other measures, GE has managed to identify and implement water savings that have reduced absolute consumption in the company by 30% since 2006. Their implementation of the Kaizen improvement methodology in their site portfolio, as well as their recognition of the business benefits of the water issue through the development of the GE Water Process & Technology business unit, shows high-level understanding of current water management issues.

PG&E

PG&E water management is impressive across a variety of metrics, not least their reduction of water in own operations by more than 5% since 2009, exceeding their own target, and with leading sites recording reductions of up to 45%. The establishment of an Environmental Leadership Index (a remuneration determinant), a company-wide Entech Energy and Environmental Management System, as well as their pioneering Green Supply Chain mean that the company is leading its competitors in water management across the board.

Taiwan Semiconductor Manufacturing

TSM have exhibited numerous examples of best practice management in coping with the situation of their major operations in areas of water stress. Methods and techniques for water-recycling, even in the provision of ultra-pure water to their own operations, are wide-ranging and provide a large and growing proportion in their own operations.

"In Indonesia, Bayer CropSciences is working with farmers and local government representatives to convert rice production from transplanted to direct-seeded rice. The results are higher yields, better quality, and an expected 30% reduction in water consumption and methane emissions."

Bayer

Chemicals

Akzo Nobel, BASF, Dow Chemical, Du Pont,
Israel Chemicals, Linde, Monsanto,
Mosaic Company, Shin-Etsu Chemical,
Syngenta International

(Public responders; Non-public responders)

Response rate: 100% (10 of 10)

Key industries within sector: Diversified chemicals (4);

Fertilizer and Agricultural Chemicals (4)

Voluntary responses: EcoLab

Opportunities

- Increasing urbanization and population growth (especially in Asia) will lead to high growth potential for water and wastewater treatment chemicals globally.
- Imposition of widespread irrigation limits in agriculture, especially in water stressed areas, will increase demand for drought-tolerant crops and water efficient fertilizers.
- High growth potential for processes and products that support more efficient water use and water recycling, as well as innovative water delivery solutions (e.g. desalination etc.).

Risks

- More stringent regulation of water withdrawals and discharge quality and improved techniques for detecting contaminants will increase treatment and management costs as well as difficulties in obtaining production licenses.
- Falling water levels (both surface and groundwater) will limit the operation and expansion of facilities that rely heavily on potable water in their manufacturing process.
- Conflicts may arise with communities and other water users in water stressed areas with significant and/or increasing pressures on fresh water supplies.

Key management indicators

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Own operations located in water stressed regions



Water intensive inputs from water stressed regions

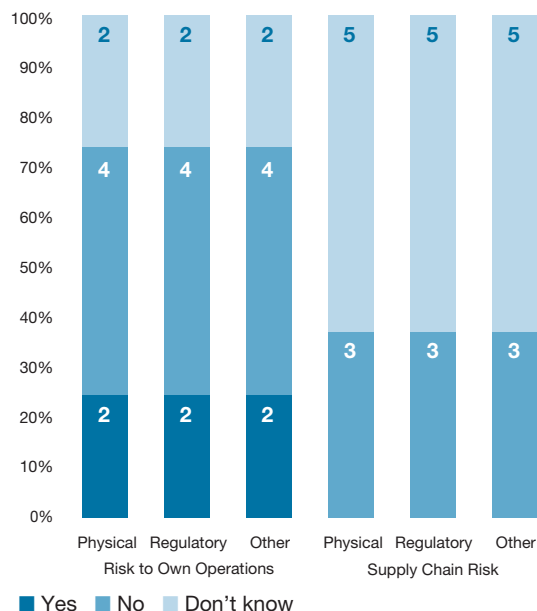


Planned/unplanned discharges



Able to identify : ■ Yes ■ No

Risks Identified



Response Summary

Management and governance

Water policy, strategy or plan in place	88%
Board/executive body oversight of water policies	75%
Specific water target set	50%

Communications

Verified more than 50% of data	50%
Provided an indicator of financial intensity	75%
Provided an indicator of activity-related intensity	50%

Accounting

Provided a figure for total water withdrawal	88%
Provided a breakdown of withdrawals by geography etc.	88%
Provided a figure for recycling/reuse	38%

Water and energy

Identified linkages between water and energy	75%
--	-----

Detrimental Impacts

- 63% of respondents identified detrimental water-related impacts in the past five years.
- Flooding disrupted the operations of five of these, for example in Indonesia and the US.
- More stringent regulations (as well as regulatory uncertainty) regarding water discharge and groundwater use have increased the operational cost of water.
- One respondent was forced to spend approximately \$100m to handle and mitigate inflows of brine to the company's operations in North America.

Case Study

Akzo Nobel and Water Risk Management

Having initiated life cycle and eco-efficiency analyses for their products in 2009, Akzo Nobel has also carried out water risk assessments at production sites pertaining to six areas: water sources, supply reliability, wastewater discharge, efficiency, compliance and social competitive factors. Action plans were developed based on the results and the company has set a target to achieve 100% sustainable fresh water management at production sites by 2015 as well as achieving significant reductions in discharge volume and improvements in discharge quality. In addition, Akzo Nobel undertakes on-site assessments of supplier sustainability practices – 200 such visits were made globally in 2009. They also require critical suppliers to perform a self-assessment regarding water risk, use, discharge, infrastructure, scarcity and sustainability.

Best Practice Actions Taken

- Establishment of a board-level Sustainability Leadership Council.
- Accurate measurement and tracking of water discharge volumes and quality, with results verified and published in annual reporting.
- Ambitious global water targets set on the basis of achievable local-level targets quantified through engagement with site level managers.
- Participation in projects and initiatives with community groups, NGOs and governments to promote water awareness, conduct research projects and address public concerns.
- Sponsorship of water research initiatives and promotion of information-sharing through the establishment of a water knowledge centre to build on company expertise.

Key Statistics

- The 100% response rate from target companies indicates an excellent awareness of water-related issues and understanding of the importance of water disclosure.
- Respondents do not appear to be operating in areas of significant water stress, with 86% companies having less than 30% of their operations in water-stressed regions. Furthermore, just 25% of companies reported facing significant physical, regulatory, or other risks in their own operations, significantly lower than other sectors.
- On the value side, 88% of respondents believe water-related issues present significant business opportunities. The increased salience of water issues globally clearly presents major business opportunities for the majority of respondents.
- There is a significant gap in awareness of supply chain risk, with 63% of respondents replying that they did not know whether their supply chain was exposed to significant risks, averaged across the responses to physical, regulatory or other risk. This should be targeted as an area for improvement in the coming year.

Key Takeaways

1. The chemical sector demonstrates a high degree of awareness of water issues in their own operations, as reflected in the proportion of companies with water policies (88%) and those who are able to identify operations in water-stressed regions (88%).
2. The shortfall in knowledge around supply chain vulnerability to water risks can improve with effective risk mapping and engagement programs with at least Tier 1 suppliers.
3. The tightening of regulations around the world on wastewater discharge quality presents a significant management challenge in the chemicals industry, where treatment techniques, management and investment must keep pace with the increasing accuracy and ubiquity of contaminant detection techniques. This will require significant investment in vulnerable sites.
4. The sharing of experience and best-practice measures across business units will be central to minimizing the detrimental impacts to operations outlined above. Companies must draw on existing expertise to inform their ongoing management of this critical issue.
5. Water-related issues present significant business opportunities to the chemical sector as the demand for water and wastewater treatment chemicals, water efficient fertilizers and technologies increases.

“Water limitations in key agricultural regions will continue to be exacerbated...multi-faceted solutions to help mitigate this complex problem will be required, and creates a significant global opportunity to develop product and trait-focused solutions.”

E.I. du Pont de Nemours and Company

“Monsanto believes water management is an important step toward sustainable agriculture and reducing agriculture's impact on the environment.”

Monsanto

Construction, Infrastructure & Real Estate

Abertis Infraestructuras,
ACS Actividades de Construcción y Servicios, **Atlantia**,
Bouygues, **Caterpillar**, Cheung Kong,
China Overseas Land & Investment, **CRH**, Deere,
Hang Lung Properties, Henderson Land Development,
Holcim, **Komatsu**, Lafarge, **Larsen & Toubro**,
Mitsubishi Estate, Mitsui Fudosan, Saint-Gobain,
Sun Hung Kai Properties, Vinci, Wharf Holdings

(Non-responders; **Public responders**)

Response rate: 29% (6 of 21)

Key industries within sector: Manufacturing of Construction and Mining Equipment (4); Construction and Infrastructure (2)
Voluntary responses: Owens Corning, Acciona

Opportunities

- Increased revenues from climate change adaptation infrastructure projects, such as flood defense and stormwater systems, as well as large infrastructure re-building projects following extreme weather disasters.
- Expanding opportunities will arise from infrastructure upgrades required to support expanding urban populations in both the transmission and treatment subsectors.

Risks

- Stricter regulation surrounding withdrawals and other changes to water allocation principles will increase costs and/or limit the scope of operations, as well as adversely affecting expansion plans in areas of water stress.
- Declining water availability and quality in specific locations will lead to higher water treatment costs, and to transportation costs in cases where water needs to be brought on-site for operations to continue.

Key management indicators

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Own operations located in water stressed regions



Water intensive inputs from water stressed regions

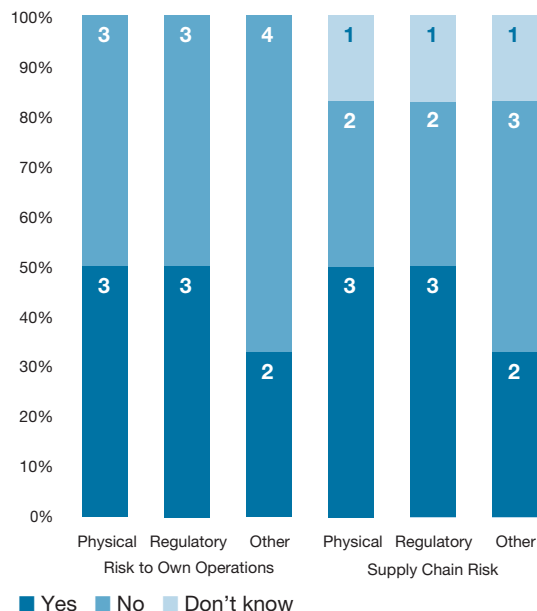


Planned/unplanned discharges



Able to identify : **Yes** **No**

Risks Identified



Response Summary

Management and governance

Water policy, strategy or plan in place	100%
Board/executive body oversight of water policies	67%
Specific water target set	50%

Communications

Verified more than 50% of data	67%
Provided an indicator of financial intensity	67%
Provided an indicator of activity-related intensity	67%

Accounting

Provided a figure for total water withdrawal	100%
Provided a breakdown of withdrawals by geography etc.	100%
Provided a figure for recycling/reuse	33%

Water and energy

Identified linkages between water and energy	50%
--	-----

Detrimental Impacts

- Most respondents have not reported any detrimental impacts related to water, but the sector is not immune from water risk, highlighted by the example of Owens Corning which suffered substantial cost from a flood at a site in India in 2005. The company responded by establishing an emergency response plan and altering the plant's layout to minimise future risks.

Case Study

Technological Improvements and Opportunity Realization

It is evident that corporations in this sector have considered what water means in a strategic sense and how they can position service offerings and modify cost structures to capitalise on water opportunities. In terms of own-site operations, Larsen & Toubro has undertaken various initiatives to reduce its per capita water use across its operations, equipping campuses with rainwater harvesting systems, and using this water for air-conditioning applications and recharge of groundwater. CRH also use recycled rainwater in 71% of their operations, significantly reducing site water costs. In terms of offerings, Komatsu Limited has developed a range of water-related technologies, including pipe-laying technology that does not require the breaking of ground, minimizes disruption and reduces costs. Larsen & Toubro's Water Process Technology business unit is expecting rapid revenue expansion stemming from their offering of advanced desalination, zero discharge and lower-cost ultra pure water technologies. While there are a range of sector initiatives, the focus on realising value with respect to water within the sector is encouraging, and is something other sectors could learn from.

Best Practice Actions Taken

- Annual environmental review of all operations, including use of publicly available tools to identify individual sites susceptible to water risk and creation of whole-operation risk maps.
- Development of sustainability guidelines to educate suppliers on water issues.
- Using business continuity plans to prepare for extended service outages caused by factors beyond the company's control (e.g. natural disasters).
- Identification of opportunities in water and wastewater treatment involving desalination and water recycling.
- Implementing rainwater harvesting systems at all sites to reduce dependence on municipal supplies.

Key Statistics

- At 29% the response rate was the joint lowest of all sectors, perhaps because water is not perceived to be a key input into operations. However, 83% of respondents identified water-related opportunities, all of which have been linked to financial benefits.
- Water measurement and monitoring is relatively widespread and sophisticated in the sector, with 100% of respondents providing withdrawal data broken down into regions. It is the only sector in which this is the case.
- None of the companies require key suppliers to report on their water use, risks and management, but 66% report that they have started this process or will do so in the near future.

Key Takeaways

1. Water-related issues present significant opportunities to the sector, and respondents are already working to convert these into cost savings and/or increased revenues. Opportunities related to water adaptation through infrastructure improvements will be especially significant.
2. Principal concerns for the sector include the lack of certainty around future regulation, expected water price increases, changes to water allocation principles in operational areas and tighter regulation of discharges.
3. None of the respondents require suppliers to report water use, risk or management (the lowest of all the sectors).
4. With one exception, respondents have yet to experience detrimental impacts arising from water-related issues, but in order to ensure this remains the case they should continue to develop water management plans to minimize risk to their operations and supply chain.

"Optimizing our use of energy and resources through efficiency gains and recycling requires the minimization of the use of natural resources including water. Recycling water is a priority. Water usage in 2009 would have been over 40% higher if recycling policies had not been implemented at Group locations."

CRH

Food, Beverage & Tobacco

Altria Group, Ambev ON, Anheuser-Busch InBev, Archer Daniels Midland, British American Tobacco, Cadbury, Coca-Cola Company, Danone, Diageo, General Mills, Heineken, Imperial Tobacco Group, Japan Tobacco, Kellogg Company, Kirin Holdings, Kraft Foods, Kroger, Nestle, PepsiCo, Pernod Ricard, Philip Morris International, SABMiller, Wilmar International

(Non-responders; Public responders;
Non-public responders)

Response rate: 65% (15 of 23)

Key industries within sector: Packaged Foods and Meats (5);
Brewers (4); Tobacco (4); Soft Drinks (2)

Voluntary responses: ConAgra Foods, Danisco, McCormick & Company, Molson Coors Brewing Company, Pilgrims Pride

Opportunities

- Reduction in water consumption can give rise to significant cost savings given the water intensive nature of the sector.
- Implementation and promotion of best practice measures can enhance reputation and yield a competitive market advantage.
- Changes in precipitation patterns may allow agricultural expansion in some areas.

Risks

- Water scarcity could significantly impact the sector as water is a major ingredient in products and a key component of most production process.
- Physical risks such as flooding threaten to disrupt operations and could lead to site closures in extreme cases, given that water is a key input for many of the sector respondents.
- Physical risk is also keenly felt in the supply chain, given the high degree of reliance on agriculture for sales or production.
- Tightening regulation across site portfolios will lead to increased operating costs and may inhibit growth.
- Increasing consumer awareness of water issues puts the food and beverage sectors at risk of reputational damage, which could adversely affect market share and/or consumer demand.

Key management indicators

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Own operations located in water stressed regions

12

Water intensive inputs from water stressed regions

5

7

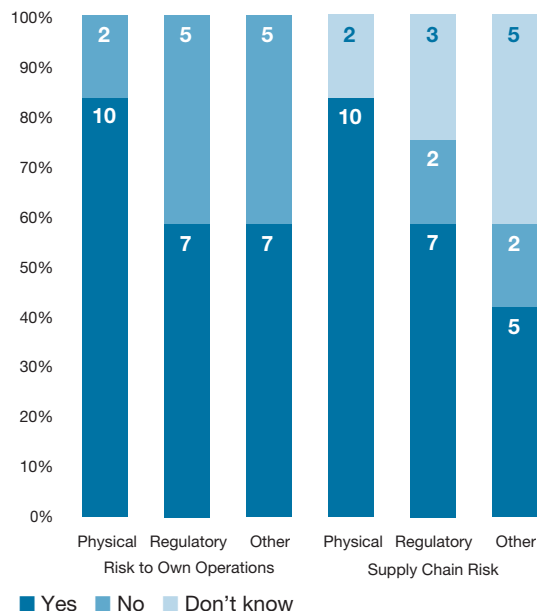
Planned/unplanned discharges

11

1

Able to identify : ■ Yes ■ No

Risks Identified



Response Summary

Management and governance

Water policy, strategy or plan in place	100%
Board/executive body oversight of water policies	75%
Specific water target set	100%

Communications

Verified more than 50% of data	42%
Provided an indicator of financial intensity	67%
Provided an indicator of activity-related intensity	83%

Accounting

Provided a figure for total water withdrawal	92%
Provided a breakdown of withdrawals by geography etc.	58%
Provided a figure for recycling/reuse	33%

Water and energy

Identified linkages between water and energy:	75%
---	-----

Detrimental Impacts

- It is clear that water-related issues are already affecting the sector, with 39% of respondents reporting detrimental impacts from water scarcity, flooding or drought.
- Declining water quality and increasing water prices have also been noted as having an adverse affect. In particular, declining water quality has in some cases necessitated expensive on-site pre-treatment equipment.

Case Study**Realizing the water and energy link**

Changing weather patterns and the recognition that energy is needed to process and clean water has led the sector to implement cutting edge technology and develop innovative tools that incorporate both carbon and water management into one integrated process. Investment in infrastructure to reduce water use whilst reducing emissions has been a key focus and in-house tools are being used to measure and evaluate sustainability impacts across the life cycle for several companies. Measures undertaken in the sector include methane capture from wastewater, and resource assessment tools that identify the linkage between resources when considering reduction opportunities. Through identifying linked reduction opportunities and carbon management techniques that may hold lessons for water, companies can accelerate performance improvements.

Best Practice Actions Taken

- Implementation of cutting edge technology on-site, such as SABMiller which now captures methane generated from wastewater treatment at several sites, accounting for up to 10% of a plant's energy mix.
- The incorporation of life cycle thinking into water management techniques, through the introduction of water as one of the impact criteria in life cycle analysis studies, improving the understanding of water use.
- Ensuring actions go beyond compliance standards, and working towards maximizing water performance rather than adhering to the legal minimum, for example Philip Morris International's installation of a non-mandatory wastewater treatment plant in Senegal.

Key Statistics

- Water is a current risk for the sector. Of the ten companies exposed to significant physical risks related to water, 80% are seeing them now or expect to within the next five years.
- The salience of water as a business issue in the sector is clear, with 69% of respondents identifying water-related opportunities. Companies that have not identified water opportunities may be missing out on the financial benefits of top level water management.

Key Takeaways

1. The Food, Beverage & Tobacco sector has long recognized the intrinsic importance of freshwater to the success of their business. The sector has pioneered several water footprinting methodologies and worked to advance methods for the Global Reporting Initiative, UN CEO Mandate, Water Footprint Network, WBCSD Global Water Tool and UN FAO Aquastat, amongst others.
2. The sector is engaged in a broad range of projects that focus on stakeholder engagement, reducing direct water use through innovation and use of technology, and introducing novel ideas to enable customers and communities to reduce their water use.
3. Water management is particularly advanced in this sector. All respondents have formulated a water strategy or management plan, and all have set either an efficiency target or an absolute reduction target and undertaken a series of water-related actions.
4. Respondents report significant water use and cost savings and continue to strive for more operational and financial savings. This illustrates the relevance of water as a business issue in the sector, and all companies would be advised to manage it accordingly.

"Through improved efficiency of water use, and active water saving campaigns in many of our operations we have been able to reduce the overall relative net cost of water."

SABMiller

"We are keenly aware that water has the ability to immediately impact our operations. Changes in quantity or quality upstream of our operations can have far-reaching and extended impacts. In addition, we have the ability to impact water users downstream of our own operations."

Molson Coors Brewing Company

Industrial & Manufacturing

3M, ABB, Air Liquide, Air Products & Chemicals, BAE Systems, Bharat Heavy Electricals, BMW Bayerische Motoren Werke, Boeing, Daimler, Danaher, DENSO, Emerson Electric, Empresas Copec, FANUC, Fiat, Ford Motor, General Dynamics, General Electric, Honda Motor Company, Honeywell International, Hutchison Whampoa, Hyundai Motor, Illinois Tool Works, ITC, Jardine Matheson, Jardine Strategic, Johnson Controls, Kimberly-Clark, Lockheed Martin, Mitsubishi, Mitsubishi Electric, Mitsui & Co, Nissan Motor, Northrop Grumman, Potash Corporation of Saskatchewan, PPR, Praxair, Raytheon, Schneider Electric, Siemens, Sime Darby Bhd, Thyssen Krupp, Toyota Motor, Tyco International, United Technologies Corporation, Volkswagen, Waste Management

(Non-responders; Public responders;
Non-public responders)

Response rate: 49% (23 of 47)

Key industries within sector: Aerospace & Defense (5);
Automobiles (5); Industrial Conglomerates (5)
Voluntary responses: Essilor International, Stanley Works, Sulzer

Opportunities

- Increasing global focus on water may result in a growing proportion of overall revenues from existing water-product business such as filtration systems, process technologies and management systems, as well as the potential for expansion of product ranges.
- Increased water awareness may allow the identification and implementation of measures to reduce water-related costs in own operations, as well as the opportunity to assist client companies and members of the supply chain to do the same.

Risks

- Competition for water in water stressed areas (particularly Asia and the US) leads to restrictions on water withdrawal and increased withdrawal costs in respondent operations as well as those of suppliers.
- Business planning is difficult because of regulatory uncertainty. Companies may face additional administration and operational costs for water management.

Key management indicators

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Own operations located in water stressed regions



Water intensive inputs from water stressed regions

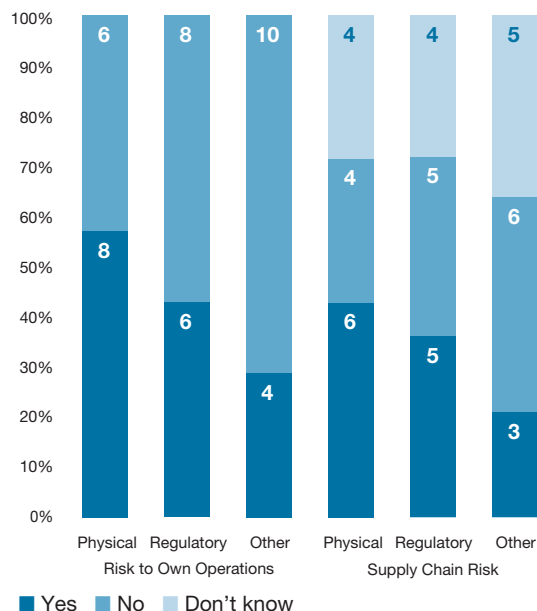


Planned/unplanned discharges



Able to identify : ■ Yes ■ No

Risks Identified



Response Summary

Management and governance

Water policy, strategy or plan in place	100%
Board/executive body oversight of water policies	79%
Specific water target set	79%

Communications

Verified more than 50% of data	57%
Provided an indicator of financial intensity	79%
Provided an indicator of activity-related intensity	50%

Accounting

Provided a figure for total water withdrawal	93%
Provided a breakdown of withdrawals by geography etc.	64%
Provided a figure for recycling/reuse	36%

Water and energy

Identified linkages between water and energy	79%
--	-----

Detrimental Impacts

- A significant impact noted by respondents was environmental fines, the largest of which was \$1 million, with a further \$11 million committed to fund environmental projects plus costs associated with upgrading standards and controls around water management and compliance.
- Respondents reported production interruptions due to storm water flooding, local water use restrictions and droughts resulting in decreased site profits.

Case Study

ITC and Water-Stressed Land Productivity in India

ITC observe that current productivity per hectare in India is considerably lower than the global average and is “abysmally low” when compared to the best performing countries. By working to stabilize the supply of water to their agribusiness sites, ITC are improving yields, safeguarding community access to water and differentiating their products in the market. Improving the efficiency of water logistics and increasing site size to improve the efficiency of water usage has helped ITC to consolidate their market position by reducing water costs, strengthening brand reputation and setting a regional water management standard.

Best Practice Actions Taken

- Engagement in initiatives to develop a standardized water accounting methodology, including the WBCSD Water Working Group and the EPA Energy Star Program benchmarking study of water use.
- Engagement with current and potential investors, including participation in the Dow Jones Sustainability Index Survey and targeting increased percentages of equity held by responsible investors.
- Use of company technology in own operations to demonstrate to potential customers how to improve water management to best-practice levels.
- Development of environmental risk assessment metrics for suppliers and evaluation of footprint of Tier 1 suppliers.
- Implementation of specific mechanisms and tools to share best practice across the company to facilitate the reduction of water consumption at all sites.

Key Statistics

- It is likely that the importance of water management will increase over time, given that 36% of respondents have more than 30% of their operations in water-stressed regions.
- Of the 86% that identified water-related opportunities, almost all identified associated positive financial implications.

Key Takeaways

1. Respondent companies have identified a range of significant water-related business opportunities that are providing a growing proportion of company revenues (e.g. General Electric, Johnson Controls, Potash Corporation of Saskatchewan).
2. Management, reduction and planning performance with respect to water issues varies widely across the respondent companies, and respondent companies who are performing less well will be required to improve practices in the future, and would be advised to update their practices in line with sector leaders as soon as possible.
3. Most companies in the sector currently have limited understanding of supply chain water risk. While some companies have already initiated programs to map supply chain risk, some company procurement processes have not been upgraded to reflect changing levels of environmental risk and the impact of public concern.

“Since we launched our Global Water Conservation Initiative in 2000, our global manufacturing facilities have saved more than 10.5 billion gallons of water – a reduction of... 62.4 percent.”

Ford Motor

“We work with more than 100,000 direct and indirect suppliers throughout the world, and expect them to conduct their operations in a socially and environmentally sustainable manner.”

Johnson Controls

Metals & Mining

Anglo American, Anglo Platinum, Anglogold Ashanti, Arcelor Mittal, Barrick Gold, BHP Billiton Ltd, China Shenhua Energy, Cia Siderurgica Nacional – CSN, Eurasian Natural Resources Corporation, Freeport – McMoRan-Copper & Gold, GMK Norilsk Nickel, Goldcorp Inc, Grupo Mexico, JFE Holdings, Newcrest Mining, Newmont Mining, Nippon Steel, Novolipetsk, POSCO, Rio Tinto, Sasol, Southern Copper Corporation, Steel Authority of India, Teck, Vale, Xstrata

(Non-responders; Public responders; Non-public responders)

Response rate: 56% (16 of 27)

Key industries within sector: Diversified Metals and Mining (4); Gold (3); Precious Metals and Minerals (3)

Voluntary responses: Exxaro Resources, HudBay Minerals, Impala Platinum, Norsk Hydro, Northam Platinum

Opportunities

- Revenue generation possibilities in the water markets may be increased through designing and operating integrated water and effluent management systems for clients that have previously been developed for own operations.
- Improving water management practices in own operations will result in increased efficiency, reduced evaporation or other process losses, and consequently reduced operational costs, and increased profits.
- Mining companies can expand their license to operate and reduce legal and compliance costs through improved cooperation with local communities and stakeholders.

Risks

- Water shortages may threaten the profitability of mines in water stressed areas, necessitating either scaled back production or interruptions to operations or investment in capital intensive projects (such as desalination and large scale pipelines) to secure sufficient supply.
- Most mines compete with local communities for limited local water resources, resulting in reputational risk and stakeholder opposition to the site itself.

Key management indicators

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Own operations located in water stressed regions



Water intensive inputs from water stressed regions

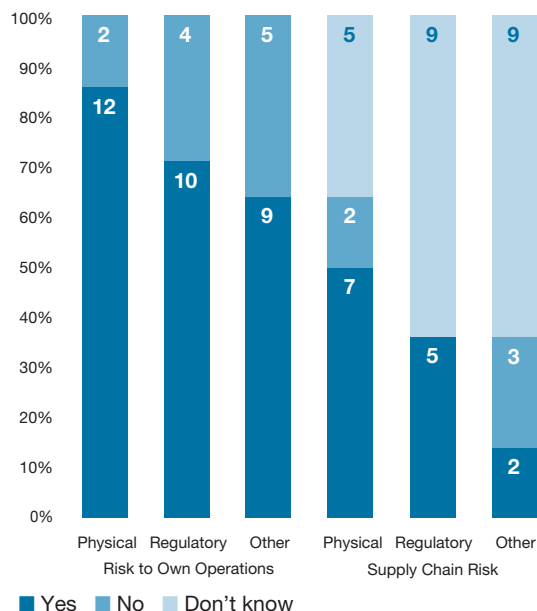


Planned/unplanned discharges



Able to identify : ■ Yes ■ No

Risks Identified



Response Summary

Management and governance

Water policy, strategy or plan in place	93%
Board/executive body oversight of water policies	86%
Specific water target set	43%

Communications

Verified more than 50% of data	64%
Provided an indicator of financial intensity	71%
Provided an indicator of activity-related intensity	64%

Accounting

Provided a figure for total water withdrawal	100%
Provided a breakdown of withdrawals by geography etc.	86%
Provided a figure for recycling/reuse	79%

Water and energy

Identified linkages between water and energy	71%
--	-----

Detrimental Impacts

- Interruption to operations due to physical water shortages.
- Fines resulting from compliance failures as a result of contaminated wastewater discharge from mining processes, such as flotation and slurry water reclamation.
- Increased expenditure for the management and treatment of tailings or other water streams as regulatory requirements have become more onerous worldwide.
- Increased NGO pressure in relation to water quality has had detrimental impacts on reputation, and more effort has been required to address community relations.

Case Study**Anglo American – Ambitious targets driving water innovation**

Anglo American's diverse businesses are setting concrete goals for better water management and community engagement, and are being proactive about achieving them. In South Africa, investment in the eMalahleni Water Reclamation plant has allowed three existing mine sites to remove themselves from the water grid, reducing the pressure on the water supply in the area, as well as ensuring three further sites will use the off-grid water source. In addition, the reclamation plant now helps to supply the local water demand. In Los Bronces, Chile, new treatment equipment and techniques have allowed reclaimed tailings water to be piped back to the mine operations, reducing the site water use by 40%. One of Anglo American's subsidiaries, Anglo Platinum, has set itself the significant challenge of "zero potable water" withdrawal for their own operations. While it is not clear whether a deadline has been set for this target, it is evident that this "call-to-arms" for water reduction has been translated into significant savings at mining operations worldwide.

Best Practice Actions Taken

- Development of integrated water and energy management plans at site level.
- Evaluation of water-related risks through feasibility studies during all stages of the mining value chain.
- Adoption of a climate change risk assessment process to assess the mining value chain.
- Investment in infrastructure improvements to increase storage and recycling capacity through efforts to identify recycling and conservation technologies, reducing site costs.
- Proactive engagement with stakeholders including government to address local water related issues, and participation in industry-wide and cross-sectoral water initiatives and organizations.

Key Statistics

- 71% of all respondents identify the linkage between water and energy in their operations, and this should help to inform successful interdependent resource management policies.
- 57% of respondents have more than 20% of their operations located in water stressed regions. Given that water is a key input to the majority of mining processes, water stressed operations represent a significant proportion of revenues for respondent companies.

Key Takeaways

1. Water is a key industrial input in the mining and metals' value chain, so the mining industry is particularly vulnerable to water scarcity. As a result, the mining industry is one of the most sophisticated sectors with regard to water management, accounting, and disclosure.
2. Water sustainability is generally addressed in a sophisticated manner, typically as part of the respondent's broader sustainability plans.
3. A significant number of respondent mining operations are located in water stressed regions, where they often compete with local communities for limited water resources. A large number of mining and metals companies are engaging with these local communities in addressing water issues, and these relationships will be crucial to them maintaining their license to operate.
4. Many of the respondent companies have identified opportunities to leverage their own water technologies and expertise beyond the mining sector. These represent significant potential revenue streams but it remains to be seen whether they will be capitalized upon given their distance from the "core business" of mining.

"Regardless of where we operate, we are mindful of the fact that water has a number of potential uses, and a range of potential users. We are committed to working with governments, other commercial organizations and communities to ensure equitable access to water."

Goldcorp

Oil & Gas

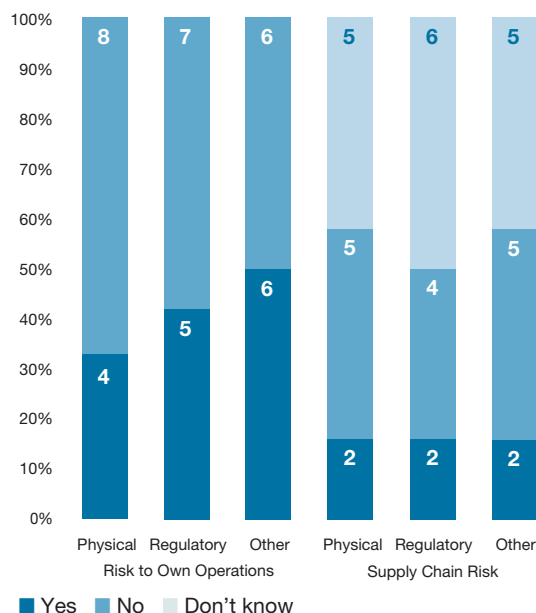
Anadarko Petroleum, **Apache**, BG Group, **BP**, Canadian Natural Resources, Chesapeake Energy, Chevron, CNOOC (Red Chip), ConocoPhillips, **Devon Energy**, **Ecopetrol**, **Enbridge**, **Eni**, **EnCana**, EOG Resources, Exxon Mobil, Formosa Petrochemical, Galp Energia, Gazprom, Gazprom Neft, **Halliburton**, **Hess**, **Husky Energy**, Imperial Oil, Indian Oil Corporation, **Inpex**, Lukoil, Marathon Oil, National Oilwell Varco, **Occidental Petroleum**, OGX Petróleo e Gás Participações, **Oil & Natural Gas**, **PETROBRAS**, PetroChina, PTT, Reliance Industries, Repsol YPF, Rosneft, Royal Dutch Shell, Schlumberger, Statoil, **Suncor Energy**, Surgutneftegaz, Talisman Energy, Tenaris, Total, TransCanada Corporation, Transocean, Tullow Oil, Woodside Petroleum, XTO Energy Inc

(Non-responders; **Public responders**;
Non-public responders)

Response rate: 29% (15 of 51)

Key industries within the sector: Exploration and Production (2); Refining and Marketing (8); Integrated Energy Company (5)
Voluntary responses: Penn West Energy Trust

Risks Identified



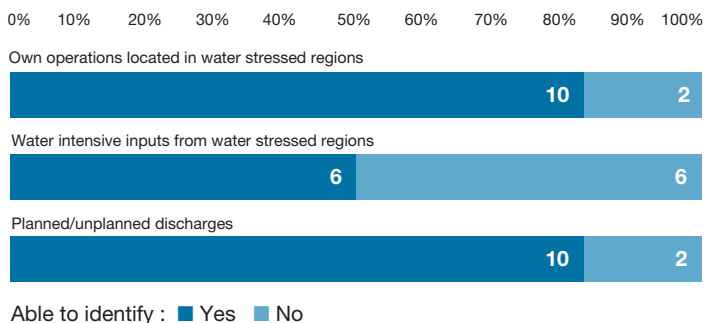
Opportunities

- Attention centers on the development and use of more water efficient technologies and practices that could increase site profitability, especially in water-intensive operations.
- Building trust and reputation in relation to environmental issues, and water in particular, will allow companies in the sector to differentiate themselves and their products in the market.

Risks

- Reputational risks to brand or image from negative water impacts are growing with the heightened scrutiny of the sector with respect to water issues.
- Tighter statutory water withdrawal limits and changes to water allocation principles may disrupt operations and constrain growth at relevant sites, particularly where there is high water usage in product processes (e.g. as a coolant).

Key management indicators



Able to identify : ■ Yes ■ No

Response Summary

Management and governance

Water policy, strategy or plan in place	58%
Board/executive body oversight of water policies	25%
Specific water target set	8%

Communications

Verified more than 50% of data	17%
Provided an indicator of financial intensity	17%
Provided an indicator of activity-related intensity	17%

Accounting

Provided a figure for total water withdrawal	50%
Provided a breakdown of withdrawals by geography etc.	42%
Provided a figure for recycling/reuse	33%

Water and energy

Identified linkages between water and energy	67%
--	-----

Detrimental Impacts

- Physical impacts on assets from excess water (e.g. land subsidence and flooding), necessitating more regular inspections.
- Litigation in relation to pollution incidents, and the payment of ensuing fines and remediation costs.
- Water scarcity has forced site underproduction in a variety of locations.

Case Study

Occidental - Enhancing reputation through community and environmental engagement

Occidental reports significant water-related actions beyond the scope of their own operations, clearly illustrating the benefits of engagement and local environmental action in mitigating reputational risk. Their efforts in both environmental and social problem-solving have been recognized internationally, not least by the Wildlife Habitat Council, who awarded Occidental the "Signature of Sustainability" for their conservation work at a site in Wichita, Kansas. The value to local communities of multinational company engagement work is highly significant, evidenced by Occidental's co-sponsorship of the building of an eight kilometer aqueduct to enhance the water supply to a 20,000-strong rural community in Argentina. These actions have strengthened the company's license to operate in these locations, and contributed to employee satisfaction. The benefits of these types of project should not be underestimated.

Best Practice Actions Taken

- Active monitoring of water data in process management procedures.
- Integrating water information into investment decisions.
- Consideration of alternative wastewater treatment options (e.g. optimization of wastewater facilities) and alternative water sources (e.g. saline groundwater and treated wastewater, precipitation).
- Use of treated municipal wastewater, which also reduces potable water use competition with local communities.
- Engagement with local and regional water resource management groups, e.g. WBCSD/World Water Council.
- Ecosystem services considered in project planning.
- Capacity building for local communities.

Key Statistics

- Despite the importance of water to continuing operations, the response rate (29%) was the joint lowest of all sectors.
- All organizations identifying 'other' significant risks in relation to their own operations identified reputational risks, indicating an awareness of the increased environmental scrutiny of the sector.
- Only 17% of respondents reported significant physical risk to their supply chain.
- 42% of respondents identified opportunities arising from water-related issues.
- Regulatory issues are perceived by 42% of companies to be significant to their own operations, with increased licensing stipulations and strengthening of regulation globally cited.

Key Takeaways

1. Given that water is a key input to the sector's operations, the 29% response rate is disappointing. In addition, only 58% of respondents have a water policy in place, which is relatively low when compared to other sectors.
2. Whilst there is recognition that water is a potential risk area for oil and gas operations, some respondents argue that the sector uses minimal water compared to sectors such as agriculture, downplaying the significance of water volumes used in oil and gas exploration and production. Such an argument is likely to lead to the underweighting of water risk to the sectors, especially in terms of the quality of available water and discharges. Companies which adopt a strategic approach to water management may benefit not only from improved stakeholder perceptions, but also in terms of business advantages related to limited natural resources.
3. Perception of risk exposure varies widely, partly due to structural differences within the sector (e.g. between onshore and offshore operations), and partly due to the differing water intensity of different production methods (e.g. oil sands versus conventional drilling).
4. Water-related reputational risk, including the effects of litigation, stakeholder concern and public perception is an increasing concern voiced by the respondents. The ongoing management of water issues should reflect this.

"Potentially the legal and reputational risks could lead to more regulatory oversight or reduced exploration opportunities for our industry."

Apache

"Repercussions of severe weather conditions can result in lower levels of exploration and development activity which can result in a decline in the demand for our services."

Halliburton

Pharmaceuticals & Biotechnology

Abbott Laboratories, Allergan, Amgen, Astellas Pharmaceutical, AstraZeneca, Bayer, Bristol Myers Squibb, Celgene, CSL, Eli Lilly, Gilead Sciences, GlaxoSmithKline, Johnson & Johnson, Merck & Co., Novartis, Novo Nordisk, Pfizer, Roche Holding, Sanofi-Aventis, Takeda Pharmaceutical, Teva Pharmaceutical Industries

(Non-responders; Public responders; Non-public responders)

Response rate: 81% (17 of 21)

Key industries within sector: Pharmaceuticals (14); Biotechnology (3)

Voluntary responses: Biogen Idec, Baxter International

Opportunities

- Increasing water scarcity and increased pressure on sanitation infrastructure may alter and spread the incidence of disease, expanding the vaccine and medicine market, particularly in emerging markets.
- Reductions in water consumption and increased recycling/reuse can save both energy and water costs, particularly at sites where highly-purified water is required, improving site profit margins.

Risks

- Competition for water in water stressed areas (particularly Asia and the US) leads to restrictions on water withdrawal and increased withdrawal costs in respondent operations as well as those of suppliers.
- Business planning is difficult because of regulatory uncertainty. Companies may face additional administration and operational costs for water management.

Key management indicators

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Own operations located in water stressed regions



Water intensive inputs from water stressed regions

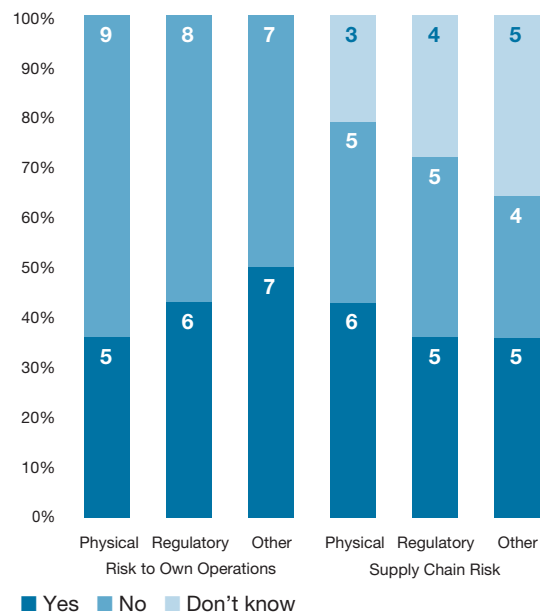


Planned/unplanned discharges



Able to identify : ■ Yes ■ No

Risks Identified



Response Summary

Management and governance

Water policy, strategy or plan in place	100%
Board/executive body oversight of water policies	64%
Specific water target set	79%

Communications

Verified more than 50% of data	50%
Provided an indicator of financial intensity	93%
Provided an indicator of activity-related intensity	29%

Accounting

Provided a figure for total water withdrawal	100%
Provided a breakdown of withdrawals by geography etc.	71%
Provided a figure for recycling/reuse	50%

Water and energy

Identified linkages between water and energy	86%
--	-----

Detrimental Impacts

- Obligations to remediate groundwater contamination as a result of historic wastewater releases, despite the company in question complying with requirements at the time of disposal.
- Four companies reported restrictions on operations as a result of droughts and water restrictions in the US and South America.
- More stringent regulation and increased public scrutiny regarding both water withdrawal and wastewater disposal across company operations, requiring expenditure on water process and discharge management upgrades.

Case Study**Merck (MSD Australia) – Cross-sectoral leadership in water management and water efficiency**

MSD Australia (a Merck subsidiary) achieved “5 Star Accreditation” under the Every Drop Counts Business Program initiative facilitated by Sydney Water. The program recognized that MSD Australia's performance with regards to water management and water efficiency was of “Best Practice” level. Through their participation in the program MSD were able to access experience and expertise around water management and efficiency, as well as share their own experiences with other participant companies, helping to improve their own performance as well as that of other participant companies. The consumption and cost savings, as well as the reputational benefits of participation, are an excellent example of how high-quality water management can turn a risk management issue into a business driver with tangible business benefits.

Best Practice Actions Taken

- Introduction of cradle-to-grave eco-efficiency assessments of products, in order to draw comparisons with similar products, and facilitate the identification of water footprint and cost reductions, especially around purified water inputs.
- Concerted efforts to reduce water consumption across all sites through identification of efficiency gains and equipment upgrades.
- Increased use of recycled or reused water, especially the introduction of closed-loop cooling towers in own operations.
- Implementation of an enterprise-wide risk management plan covering both own operations and the supply chain.
- Installation of condensate capture and polish systems to recapture and recondition boiler condensation.

Key Statistics

- 21% of respondents have more than 30% of their operations in water stressed areas, which is low compared to other sectors.
- Encouragingly, some respondents are taking action on this issue, with 29% reporting that they have started a supply chain risk mapping exercise for their Tier 1 suppliers, though only 21% of respondents currently require key suppliers to report their water use, risks and management.

Key Takeaways

1. The response rate is the second-highest of all sectors and the responses themselves have shown broad consideration of water issues.
2. The sector is particularly concerned about higher regulatory costs and competition for access to water, and the management of these issues (particularly in areas of high-water stress) will be important if current performance is to be maintained.
3. Respondents identify particularly complex risks to their operations. They must make a concerted effort to manage and minimize risks as regulatory frameworks continue to develop and water becomes more stressed, particularly in Asia.
4. Of the respondents who focused on water reduction and management, the improvements in performance are significant, with three companies reporting absolute reductions in water use of 13% or more in the past four years. Given the reliance of the sector on adequate water supplies, effective demand management is increasingly important for maintaining operational viability in water stressed areas.

“Water quality is a critical component of pharmaceutical production and access to clean water is required to achieve the water quality requirements for pharmaceutical production.”

Merck & Co.

“CSL has engaged with water utilities on relevant water management issues as they have arisen with a view to ensuring future secure access to a high quality water supply which is essential for the manufacture of biopharmaceutical products.”

CSL

Retail, Consumer Discretionary & Consumer Staples

Ahold, Beiersdorf, Best Buy, Carnival Corporation, Carrefour, Christian Dior, Colgate-Palmolive, Costco Wholesale, CVS Caremark, Fast Retailing, Gap, H&M Hennes & Mauritz, Hermes International, Inditex, Kohl's, L'Oréal, LVMH, McDonald's, Metro, NIKE, Procter & Gamble, Reckitt Benckiser, Richemont, Seven & I Holding, Staples, Starbucks, Sysco, Target, Tesco, TJX Companies, Unilever, Walgreen Company, Wal-Mart de Mexico, Wal-Mart Stores, Wesfarmers, Woolworths, Yum! Brands

(Non-responders; Public responders;
Non-public responders)

Response rate: 46% (17 of 37)

Key industries within the sector: Apparel Retail (2); Personal Products (3); General Merchandise Stores (2)

Voluntary responses: Natura Cosméticos, Nedbank, NH Hoteles, Reed Elsevier, Woolworths Holdings

Opportunities

- There are likely to be increasing business benefits from improved reputation and customer loyalty through customer engagement around water-related projects.
- There is a growing consumer demand for water efficient products such as water efficient detergents and appliances. Some respondents are moving to take advantage of this development.
- Further into the future, companies with sector-leading water policies and action plans, especially in water-stressed regions, are likely to experience competitive advantage with respect to product differentiation.

Risks

- Water scarcity may result in reduced production of raw materials and crops resulting in higher product prices and increased price volatility.
- Extreme weather events such as floods may affect crops, damage facilities and goods and disrupt business continuity.
- The sector's supply chain is particularly susceptible to water risk and water shortages that can lead directly to pass-through costs for retailers.

Key management indicators

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Own operations located in water stressed regions



Water intensive inputs from water stressed regions

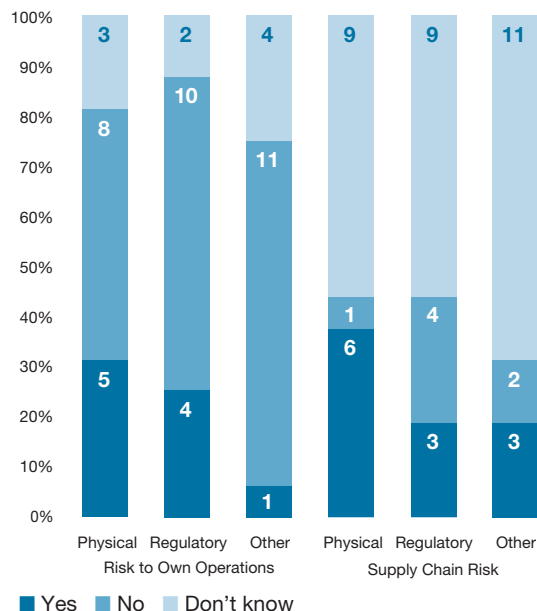


Planned/unplanned discharges



Able to identify : ■ Yes ■ No

Risks Identified



Response Summary

Management and governance

Water policy, strategy or plan in place	81%
Board/executive body oversight of water policies	63%
Specific water target set	56%

Communications

Verified more than 50% of data	50%
Provided an indicator of financial intensity	63%
Provided an indicator of activity-related intensity	81%

Accounting

Provided a figure for total water withdrawal	81%
Provided a breakdown of withdrawals by geography etc.	63%
Provided a figure for recycling/reuse	25%

Water and energy

Identified linkages between water and energy	56%
--	-----

Detrimental Impacts

- Companies in the retail sector have so far experienced only limited detrimental impacts from water.
- Respondents are experiencing tightening regulatory requirements for water discharge quality and increased costs associated with meeting these requirements.
- Financial impacts have included increases in insurance premiums, treatment costs to meet water quality regulatory requirements and water tariffs, all resulting in higher operating costs.
- Respondents have experienced increased competition for water resources in some localities, which may increase costs and reduce access in future.

Case Study**Woolworths Holdings (South Africa) – Engaging the Supply Chain in Water Sustainability**

Woolworths Holdings is a retail group based in South Africa, a country facing significant water challenges. Woolworths has established a comprehensive partnership program with its supply chain around water reporting and management in order to identify and manage current and potential water risks. All of Woolworths' suppliers are required to report water use as part of the Woolworths Supplier Code of Conduct. In addition, Woolworths has launched the "Farming for the Future Program" for its food suppliers to help to address the acute water related problems in South Africa. The company has invested in research on sustainable farming practices resulting in high yields with no adverse environmental impacts while preserving biodiversity and conserving water resources. All farmers supplying products to Woolworths have joined the program and by 2012 all locally grown fresh produce (other than organically certified produce) will be grown this way. The company has partnered with WWF South Africa to match supplier farms and particular crops against catchment systems and biodiversity hotspots. The company has also worked with the CSIR in South Africa to measure and benchmark water management practices for local textile suppliers.

Best Practice Actions Taken

- Consideration of water when designing facilities to maximize efficiency and minimize the need for wastewater treatment.
- Identification and implementation of water efficiency opportunities at existing sites.
- Establishment of programs to raise employee and customer awareness on water conservation.
- Participation in industry-wide water initiatives and building of partnerships with NGOs on water-related projects.

Key Statistics

- Respondents perceive little water risk, with only 31% identifying significant water risks to their direct operations.
- A significant proportion of respondents (38%) have reported that they are not currently able to identify which of their operations are located in water stressed regions.
- Despite the relatively low significance of water to respondents, 50% identify opportunities related to water, principally cost reductions through efficiency gains.

Key Takeaways

1. The majority of companies from the retail sector do not consider water an immediate risk to their direct business operations, but many of them are yet to measure their vulnerability to water issues across their portfolio of sites.
2. The sector's significant risks are principally associated with the supply chain, though only one respondent currently requires key suppliers to report on their water use and management. The majority of companies have not yet assessed the vulnerability of their supply chains, and they are advised to do so promptly.
3. 50% of companies report business opportunities related to water. Most of these companies belong to the Personal Products sub-category and water related innovation is a major component of their R&D process for new products.

"L'Oréal takes the greatest care to conserve water, the world's most precious resource. Our focus is on reducing water consumption in our factories since this is where most of our water is used."

L'Oréal

"If water resources [are] over-exploited extensively, public expectations regarding a more sustainable water management and a fair distribution of the available resources are likely to increase significantly. Suppliers who don't adapt their business activities to these expectations could quickly come under pressure."

Metro

Technology & Communications

Apple Inc., **Applied Materials**, Automatic Data Process, BYD Company, **Canon**, Cisco Systems, Corning, **Dell**, EMC, Ericsson, **Hewlett-Packard**, Hon Hai Precision Industry, **Intel**, IBM, Kyocera Corporation, **MasterCard**, **MediaTek**, **Motorola**, Nokia Group, Panasonic, **Philips Electronics**, Qualcomm, **Research In Motion**, **Samsung Electronics**, Sony, **Taiwan Semiconductor Manufacturing**, **Texas Instruments**, **Toshiba**, Visa

(Non-responders; **Public responders**;
Non-public responders)

Response rate: 59% (17 of 29)

Key industries within sector: Hardware and Equipment (10); Semiconductors and Semiconductor Equipment (4); Consumer Durables
Voluntary responses: None

Opportunities

- There is an expanding market for water monitoring and metering technologies that encourage responsible water consumption in a range of sectors from agriculture to private homes.
- The industry is pioneering systems that already form the basis of water purification technologies and reuse techniques, and these will likely result in significant revenue streams for the sector.
- Expanding markets for web-based technologies linking weather forecasting to building and facility controls to increase water efficiency.

Risks

- There is an increasing shortage of cooling and cleaning water in operations located in water-stressed areas.
- More stringent water withdrawal and discharge quality requirements will lead to increasing operational and capital costs for water management.
- There is a lack of understanding around the exposure of supply chains to water risk, and as a result these risks are largely not yet being managed.

Key management indicators

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Own operations located in water stressed regions



Water intensive inputs from water stressed regions

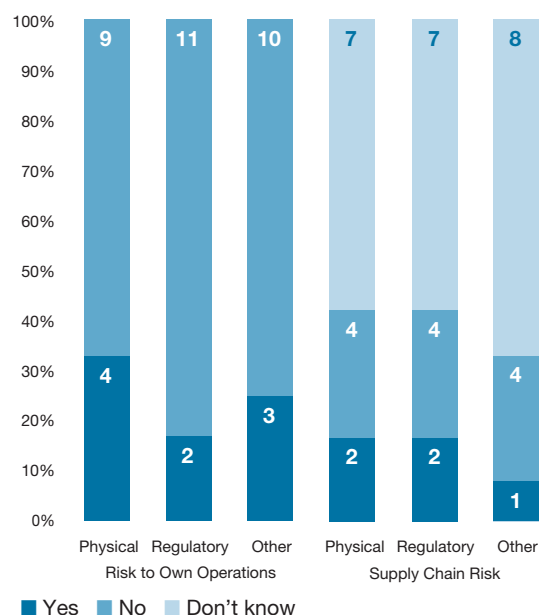


Planned/unplanned discharges



Able to identify : ■ Yes ■ No

Risks Identified



Response Summary

Management and governance

Water policy, strategy or plan in place	92%
Board/executive body oversight of water policies	85%
Specific water target set	85%

Communications

Verified more than 50% of data	25%
Provided an indicator of financial intensity	85%
Provided an indicator of activity-related intensity	62%

Accounting

Provided a figure for total water withdrawal	100%
Provided a breakdown of withdrawals by geography etc.	69%
Provided a figure for recycling/reuse	58%

Water and energy

Identified linkages between water and energy	85%
--	-----

Detrimental Impacts

- Regulatory tightening has forced one respondent to undertake water remediation programs at 18 sites, incurring around \$1 million in costs.
- Another company's compliance failure led to an NGO-organized boycott of their products, forcing the company to build a new water treatment facility and undertake third party assessments in order to mitigate the threat to their license to operate in the region.

Case Study**Taiwan Semiconductor Manufacturing (TSM) – Adapting operations in reaction to increased water stress**

In adapting their operations to the requirements of a tight water regime, TSM provide a strong illustration of water management and systems upgrades, while also exploiting opportunities to improve business performance. These measures include using an intranet web site to collect and measure water withdrawal, water recycling and/or reuse volumes (e.g. process water recycling) in order to optimize water usage for the whole organization; organic/acid water recycling systems; wet scrubber recycling systems; and the adoption of reverse osmosis and electro-dialysis reversal techniques to reclaim wastewater. TSM are also well-positioned to capitalize on increased demand for water-conservation technologies, holding three technological patents.

Best Practice Actions Taken

- Established specialist environmental evaluation systems based on life cycle assessment (LCA) of products.
- Reduced withdrawals and discharges by introducing closed-loop systems, “smart” automated systems management, waterless sanitation and cutting edge treatment technologies.
- Mitigation of all types of risk through early and concerted action, even as regulation and physical factors are becoming current rather than future risks.
- Investment in research and development and pilot projects around smart water grid systems, both on the site and municipal levels.
- Established green procurement standards for all suppliers.
- Contribution to science, knowledge sharing, client solutions and public policy, such as IBM's founding of the Global Centre for Excellence in Water Management early 2008.

Key Statistics

- Of companies who identify risks to their own operations, 70% recognize financial implications associated with those risks.
- 77% of respondents were unable to identify which of their key water-intensive inputs came from water-stressed regions.
- Water-related issues are identified as presenting significant opportunities to 54% of respondents.

Key Takeaways

1. Water-related issues represent significant revenue opportunities for those companies in the sector who offer metering, purification, management and treatment solutions.
2. Management practice, including comprehensive risk assessments and consideration of associated financial impacts, give rise to optimism regarding the handling of water-related issues in this sector.
3. Despite the relatively low water use in the sector's manufacturing or fulfillment processes, companies are pioneering measurement and other systems, which underpin technologies used in other sectors.
4. There is currently a lack of understanding in the sector around water-related supply chain risk, but there is an indication that action is being taken to map this risk.
5. Water issues are a growing burden to operations, especially in Asia, and companies in current or imminently water-stressed areas.

“IBM's technologies and solutions will enable business, governments and others to better understand, anticipate, and address the potential physical impacts of water resource limitations and the challenges brought by climate change.”

IBM

“Motorola conducts routine risk assessments to identify high-risk situations that could adversely affect our operations. Our crisis teams have developed preparedness plans to ensure that our response will be effective and our recovery swift.”

Motorola

Utilities

Alstom, American Electric Power, Centrica, CEZ, Chubu Electric Power, CLP Holdings, Dominion Resources, Duke Energy, E.ON, EDP - Energias de Portugal, Electricite de France (EDF), ELECTROBRAS, Endesa, ENEL, Entergy, Exelon, Fortum, Gas Natural SDG, GDF Suez, Hong Kong and China Gas, Iberdrola, Iberdrola Renovables, Kansai Electric Power, Korea Electric Power (Kepco), National Grid, National Thermal Power (NTPC), NextEra Energy, PG&E, Polska Grupa Energetyczna, Public Service Enterprise Group, RWE, Scottish & Southern Energy, Snam Rete Gas, Southwestern Energy, Tepco (Tokyo Electric Power), The Southern Company, Veolia Environment

(Non-responders; Public responders)

Response rate: 38% (14¹ of 37)

Key industries within sector: Electric Utility (6); Integrated Energy (4); Electricity and Gas (2); Clean Energy (2)

Voluntary responses: Eskom

Opportunities

- There will be an increasing role for hydroelectric systems and techniques (e.g. for storing electricity generated by renewables at times of excess supply) as countries increase their renewables capacity.
- Identification and implementation of low-water intensity technology to reduce withdrawals and improve the quality of wastewater discharges.
- Companies may be able to differentiate their brands by focusing on water issues, including by siting facilities in areas with abundant water.

Risks

- Regulatory restrictions on water usage and effluent quality could reduce hydropower activity.
- Increased water stress leading to higher energy/commodity prices and/or disruption to operations. This is particularly associated with cooling water requirements at power stations and with hydropower assets.
- Reputational risks may arise from associated responsibility for water suppliers' non-compliance with regulations.

Key management indicators

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Own operations located in water stressed regions



Water intensive inputs from water stressed regions



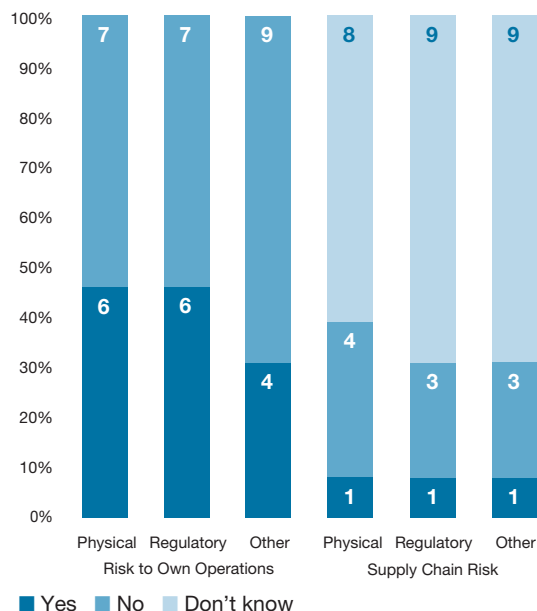
Planned/unplanned discharges



Able to identify : ■ Yes ■ No

1. Please note that only 13 responses were included in the Utilities sector data analysis.

Risks Identified



Response Summary

Management and governance

Water policy, strategy or plan in place	85%
Board/executive body oversight of water policies	54%
Specific water target set	38%

Communications

Verified more than 50% of data	38%
Provided an indicator of financial intensity	69%
Provided an indicator of activity-related intensity	46%

Accounting

Provided a figure for total water withdrawal	62%
Provided a breakdown of withdrawals by geography etc.	23%
Provided a figure for recycling/reuse	23%

Water and energy

Identified linkages between water and energy:	69%
---	-----

Detrimental Impacts

- Flood disruption and/or drought conditions requiring changes in operational procedures and investment to ensure availability of water supply for hydroelectric power e.g. purchasing of further water rights.
- Activity of NGOs in opposition to the construction of hydroelectric facilities in areas of water stress.

Case Study

PG&E – Customer Engagement

PG&E partnered with several municipal water agencies to offer a pilot program focused on helping customers save energy by using less water. This program targeted the “embedded” energy used to transport, treat and distribute water and wastewater. As a major focus of the program, PG&E collaborated with several water agencies to provide incentives to 11 high-use commercial customers. Customers earned rebates from both PG&E and their local water agency by conducting water audits and then retrofitting laundry equipment, replacing commercial dishwashers, upgrading toilets and sinks and switching from potable water to recycled water for cooling towers and landscaping. At the conclusion of the pilot, the water agencies reported water savings of more than 27 million gallons per year and wastewater savings of 8.8 million gallons per year.

Best Practice Actions Taken

- Consideration of alternative wastewater treatment options and alternative water sources (e.g. condensate water recovery; reclamation of wastewater).
- Adoption of water efficient technologies in own operations.
- Consideration of best generation technology for areas of local water stress.
- Engagement with local and regional water resource management groups, e.g. WBCSD/World Water Council.
- Active participation in local wetlands/habitat conservation groups/initiatives.
- Encouragement of suppliers to report water usage.
- Capacity building for local communities (e.g. toilet installation in low-income homes, sustainable and environmental solutions in refugee camps, and grey water treatment for non-potable use).
- Supply of treated wastewater for municipal use.

Key Statistics

- The energy-water nexus is particularly pertinent to this sector, with 69% of respondents identifying a strong link between water and energy.
- Nearly all (92%) of respondents are able to identify planned and unplanned discharges from their own operations by destination, treatment method and quantity.
- Reputational risks are a key concern with regard to water, with 75% of respondents that identified “other” water risk identifying reputational issues.
- Both plant site permitting and regulatory uncertainty were identified by 31% respondents as key regulatory risks.

Key Takeaways

1. For the utilities sector, the principal environmental concern has historically centered on air emissions, which create greater financial, environmental and operational risks. However, energy generation’s requirement for water either as a centre resource (e.g. for hydropower) or as a coolant is making water management increasingly important.
2. Respondents display only a limited understanding of supply chain risks, and should work to improve this.
3. There is a high level of focus within responses on hydroelectricity generation as such investments are particularly at risk from water security and local community or NGO opposition.
4. There is generally a good understanding of the energy-water nexus, with 69% of respondents identifying linkages between usage of energy and water. In general, water savings entail energy savings, but there are areas where this is not the case, such as the use of non-contact cooling water. Understanding the specifics of the nexus in the utilities sector will be important to effective ongoing resource management.

“It is inevitable that water will become a highly regulated and state- controlled resource, with power companies having to internalize the future regulatory and cost implications within their business models. The wider geo-political risks arising from access to scarce water resources should be considered for facilities located in sensitive areas.”

Endesa

“At our power plants in the US (highest water consumption business entity) we have developed plans to install variable speed cooling water pumps which will reduce water usage as much as 50% as well as reduce potential impact to aquatic organisms.”

National Grid

Appendix: Table of response status and sector by company

Company	Sector	Response status	Non-public
3M	Industrial & Manufacturing	AQ	
ABB	Industrial & Manufacturing	IN	
Abbott Laboratories	Pharmaceuticals & Biotechnology	AQ	
Abertis Infraestructuras	Construction, Infrastructure & Real Estate	DP	NP
ACS Actividades de Construcción y Servicios	Construction, Infrastructure & Real Estate	NR	
Ahold	Retail, Consumer Discretionary & Consumer Staples	DP	NP
Air Liquide	Industrial & Manufacturing	AQ	
Air Products & Chemicals	Industrial & Manufacturing	AQ	
Akzo Nobel	Chemicals	AQ	
Allergan	Pharmaceuticals & Biotechnology	AQ	
Alstom	Utilities	AQ	
Altria Group	Food, Beverage & Tobacco	AQ	
AmBev - Cia. Bebidas das Americas	Food, Beverage & Tobacco	AQ	
American Electric Power	Utilities	AQ	
Amgen	Pharmaceuticals & Biotechnology	AQ	NP
Anadarko Petroleum	Oil & Gas	NR	
Anglo American	Metals & Mining	AQ	
Anglo Platinum	Metals & Mining	AQ	
AngloGold Ashanti	Metals & Mining	AQ	NP
Anheuser Busch InBev	Food, Beverage & Tobacco	AQ	
Apache	Oil & Gas	AQ	
Apple Inc.	Technology & Communications	NR	
Applied Materials	Technology & Communications	AQ	
Arcelor Mittal	Metals & Mining	AQ	
Archer Daniels Midland	Food, Beverage & Tobacco	NR	
Astellas Pharma	Pharmaceuticals & Biotechnology	NR	

Company	Sector	Response status	Non-public
AstraZeneca	Pharmaceuticals & Biotechnology	AQ	
Atlantia	Construction, Infrastructure & Real Estate	AQ	
Automatic Data Processing	Technology & Communications	DP	NP
BAE Systems	Industrial & Manufacturing	DP	NP
Barrick Gold	Metals & Mining	AQ	
BASF	Chemicals	AQ	
Bayer	Pharmaceuticals & Biotechnology	AQ	
Beiersdorf	Retail, Consumer Discretionary & Consumer Staples	AQ	NP
Best Buy	Retail, Consumer Discretionary & Consumer Staples	NR	
BG Group	Oil & Gas	IN	
Bharat Heavy Electricals	Industrial & Manufacturing	NR	
BHP Billiton	Metals & Mining	AQ	
BMW Bayerische Motoren Werke	Industrial & Manufacturing	AQ	
Boeing	Industrial & Manufacturing	AQ	
Bouygues	Construction, Infrastructure & Real Estate	NR	
BP	Oil & Gas	AQ	
Bristol-Myers Squibb	Pharmaceuticals & Biotechnology	AQ	
British American Tobacco	Food, Beverage & Tobacco	AQ	
BYD Company	Technology & Communications	NR	
Cadbury	Food, Beverage & Tobacco	NR	
Canadian Natural Resources	Oil & Gas	IN	
Canon	Technology & Communications	AQ	
Carnival Corporation	Retail, Consumer Discretionary & Consumer Staples	AQ	
Carrefour	Retail, Consumer Discretionary & Consumer Staples	AQ	

Company	Sector	Response status	Non-public
Caterpillar	Construction, Infrastructure & Real Estate	AQ	
Celgene	Pharmaceuticals & Biotechnology	NR	
Centrica	Utilities	AQ	
CEZ	Utilities	NR	
Chesapeake Energy	Oil & Gas	NR	
Cheung Kong	Construction, Infrastructure & Real Estate	NR	
Chevron	Oil & Gas	DP	NP
China Overseas Land & Investment	Construction, Infrastructure & Real Estate	NR	
China Shenhua Energy (H)	Metals & Mining	AQ	NP
Christian Dior	Retail, Consumer Discretionary & Consumer Staples	NR	
Chubu Electric Power	Utilities	NR	
Cia. Siderurgica Nacional - CSN	Metals & Mining	AQ	
Cisco Systems	Technology & Communications	AQ	NP
CLP Holdings	Utilities	AQ	
CNOOC (Red Chip)	Oil & Gas	DP	NP
Coca-Cola Company	Food, Beverage & Tobacco	IN	NP
Colgate-Palmolive	Retail, Consumer Discretionary & Consumer Staples	AQ	
ConocoPhillips	Oil & Gas	NR	
Corning	Technology & Communications	DP	NP
Costco Wholesale	Retail, Consumer Discretionary & Consumer Staples	NR	
CRH	Construction, Infrastructure & Real Estate	AQ	
CSL	Pharmaceuticals & Biotechnology	AQ	
CVS Caremark	Retail, Consumer Discretionary & Consumer Staples	DP	
Daimler	Industrial & Manufacturing	AQ	NP
Danaher	Industrial & Manufacturing	NR	
Danone	Food, Beverage & Tobacco	AQ	NP
Deere	Construction, Infrastructure & Real Estate	IN	
Dell	Technology & Communications	AQ	
Denso	Industrial & Manufacturing	NR	

Company	Sector	Response status	Non-public
Devon Energy	Oil & Gas	AQ	
Diageo	Food, Beverage & Tobacco	AQ	
Dominion Resources	Utilities	DP	NP
Dow Chemical	Chemicals	AQ	
Duke Energy	Utilities	AQ	
E.I. du Pont de Nemours and Company	Chemicals	AQ	
E.ON AG	Utilities	DP	NP
Ecopetrol	Oil & Gas	AQ	
EDP - Energias de Portugal	Utilities	AQ	
Electricite de France (EDF)	Utilities	DP	NP
ELETRONBRAS	Utilities	NR	
Eli Lilly	Pharmaceuticals & Biotechnology	NR	
EMC	Technology & Communications	NR	
Emerson Electric	Industrial & Manufacturing	DP	NP
Empresas Copec	Industrial & Manufacturing	NR	
Enbridge	Oil & Gas	AQ	
Encana	Oil & Gas	AQ	
Endesa	Utilities	AQ	
ENEL	Utilities	NR	
Eni	Oil & Gas	AQ	NP
Entergy	Utilities	AQ	
EOG Resources	Oil & Gas	DP	NP
Ericsson	Technology & Communications	DP	NP
Eurasian Natural Resources Corporation	Metals & Mining	NR	
Exelon	Utilities	NR	
Exxon Mobil	Oil & Gas	NR	
FANUC	Industrial & Manufacturing	NR	
Fast Retailing	Retail, Consumer Discretionary & Consumer Staples	NR	
Fiat	Industrial & Manufacturing	NR	
Ford Motor	Industrial & Manufacturing	AQ	
Formosa Petrochemical	Oil & Gas	NR	
Fortum	Utilities	NR	
Freeport-McMoRan Copper & Gold	Metals & Mining	AQ	
Galp Energia	Oil & Gas	NR	
Gap	Retail, Consumer Discretionary & Consumer Staples	DP	

Company	Sector	Response status	Non-public
Gas Natural SDG	Utilities	NR	
Gazprom	Oil & Gas	NR	
Gazprom Neft	Oil & Gas	NR	
GDF Suez	Utilities	DP	NP
General Dynamics	Industrial & Manufacturing	NR	
General Electric	Industrial & Manufacturing	AQ	
General Mills	Food, Beverage & Tobacco	AQ	
Gilead Sciences	Pharmaceuticals & Biotechnology	AQ	
GlaxoSmithKline	Pharmaceuticals & Biotechnology	AQ	
GMK Norilsk Nickel	Metals & Mining	NR	
Goldcorp	Metals & Mining	AQ	
Grupo Mexico	Metals & Mining	NR	
H&M Hennes & Mauritz	Retail, Consumer Discretionary & Consumer Staples	AQ	
Halliburton	Oil & Gas	AQ	
Hang Lung Properties	Construction, Infrastructure & Real Estate	NR	
Heineken	Food, Beverage & Tobacco	NR	
Henderson Land Development	Construction, Infrastructure & Real Estate	NR	
Hermes International	Retail, Consumer Discretionary & Consumer Staples	NR	
Hess	Oil & Gas	AQ	
Hewlett-Packard	Technology & Communications	AQ	
Holcim	Construction, Infrastructure & Real Estate	AQ	
Hon Hai Precision Industry	Technology & Communications	NR	
Honda Motor Company	Industrial & Manufacturing	AQ	NP
Honeywell International	Industrial & Manufacturing	NR	
Hong Kong and China Gas	Utilities	NR	
Husky Energy	Oil & Gas	AQ	
Hutchison Whampoa	Industrial & Manufacturing	NR	
Hyundai Motor	Industrial & Manufacturing	NR	
Iberdrola	Utilities	AQ	
Iberdrola Renovables	Utilities	DP	NP
IBM	Technology & Communications	AQ	
Illinois Tool Works	Industrial & Manufacturing	AQ	NP
Imperial Oil	Oil & Gas	DP	NP

Company	Sector	Response status	Non-public
Imperial Tobacco Group	Food, Beverage & Tobacco	AQ	NP
Indian Oil Corporation	Oil & Gas	NR	
Inditex	Retail, Consumer Discretionary & Consumer Staples	AQ	
Inpex	Oil & Gas	AQ	
Intel	Technology & Communications	AQ	
Israel Chemicals	Chemicals	AQ	
ITC	Industrial & Manufacturing	AQ	
Japan Tobacco	Food, Beverage & Tobacco	NR	
Jardine Matheson	Industrial & Manufacturing	DP	NP
Jardine Strategic	Industrial & Manufacturing	DP	NP
JFE Holdings	Metals & Mining	NR	
Johnson & Johnson	Pharmaceuticals & Biotechnology	AQ	
Johnson Controls	Industrial & Manufacturing	AQ	
Kansai Electric Power	Utilities	NR	
Kellogg Company	Food, Beverage & Tobacco	AQ	
Kimberly-Clark	Industrial & Manufacturing	IN	
Kirin Holdings	Food, Beverage & Tobacco	AQ	
Kohl's	Retail, Consumer Discretionary & Consumer Staples	AQ	
Komatsu	Construction, Infrastructure & Real Estate	AQ	
Korea Electric Power (Kepco)	Utilities	NR	
Kraft Foods	Food, Beverage & Tobacco	NR	
Kroger	Food, Beverage & Tobacco	AQ	
Kyocera Corporation	Technology & Communications	AQ	NP
Lafarge	Construction, Infrastructure & Real Estate	NR	
Larsen & Toubro	Construction, Infrastructure & Real Estate	AQ	
Linde	Chemicals	AQ	
Lockheed Martin	Industrial & Manufacturing	AQ	
L'Oréal	Retail, Consumer Discretionary & Consumer Staples	AQ	
Lukoil	Oil & Gas	NR	
LVMH	Retail, Consumer Discretionary & Consumer Staples	AQ	

Company	Sector	Response status	Non-public
Marathon Oil	Oil & Gas	IN	
MasterCard	Technology & Communications	DP	NP
McDonald's	Retail, Consumer Discretionary & Consumer Staples	NR	
MediaTek	Technology & Communications	NR	
Merck & Co.	Pharmaceuticals & Biotechnology	AQ	
Metro	Retail, Consumer Discretionary & Consumer Staples	AQ	
Mitsubishi	Industrial & Manufacturing	DP	NP
Mitsubishi Electric	Industrial & Manufacturing	NR	
Mitsubishi Estate	Construction, Infrastructure & Real Estate	NR	
Mitsui & Co	Industrial & Manufacturing	NR	
Mitsui Fudosan	Construction, Infrastructure & Real Estate	NR	
Monsanto	Chemicals	AQ	
Mosaic Company	Chemicals	AQ	NP
Motorola	Technology & Communications	AQ	
National Grid	Utilities	AQ	
National Oilwell Varco	Oil & Gas	NR	
National Thermal Power (NTPC)	Utilities	NR	
Nestle	Food, Beverage & Tobacco	AQ	
Newcrest Mining	Metals & Mining	AQ	
Newmont Mining	Metals & Mining	AQ	
NextEra Energy	Utilities	AQ	
NIKE	Retail, Consumer Discretionary & Consumer Staples	NR	
Nippon Steel	Metals & Mining	DP	NP
Nissan Motor	Industrial & Manufacturing	DP	NP
Nokia Group	Technology & Communications	AQ	NP
Northrop Grumman	Industrial & Manufacturing	AQ	NP
Novartis	Pharmaceuticals & Biotechnology	AQ	
Novo Nordisk	Pharmaceuticals & Biotechnology	AQ	
Novolipetsk	Metals & Mining	NR	
Occidental Petroleum	Oil & Gas	AQ	
OGX Petróleo e Gás Participações	Oil & Gas	NR	
Oil & Natural Gas	Oil & Gas	AQ	

Company	Sector	Response status	Non-public
Panasonic	Technology & Communications	AQ	NP
PepsiCo	Food, Beverage & Tobacco	AQ	NP
Pernod-Ricard	Food, Beverage & Tobacco	DP	NP
PETROBRAS	Oil & Gas	AQ	NP
PetroChina	Oil & Gas	NR	
Pfizer	Pharmaceuticals & Biotechnology	AQ	NP
PG&E	Utilities	AQ	
Philip Morris International	Food, Beverage & Tobacco	AQ	
Philips Electronics	Technology & Communications	AQ	
Polska Grupa Energetyczna	Utilities	NR	
POSCO	Metals & Mining	AQ	
Potash Corporation of Saskatchewan	Industrial & Manufacturing	AQ	
PPR	Industrial & Manufacturing	NR	
Praxair	Industrial & Manufacturing	AQ	NP
Procter & Gamble	Retail, Consumer Discretionary & Consumer Staples	AQ	
PTT	Oil & Gas	NR	
Public Service Enterprise Group	Utilities	NR	
Qualcomm	Technology & Communications	NR	
Raytheon	Industrial & Manufacturing	AQ	
Reckitt Benckiser	Retail, Consumer Discretionary & Consumer Staples	NR	
Reliance Industries	Oil & Gas	NR	
Repsol YPF	Oil & Gas	NR	
Research In Motion	Technology & Communications	AQ	
Richemont	Retail, Consumer Discretionary & Consumer Staples	DP	NP
Rio Tinto	Metals & Mining	AQ	
Roche Holding	Pharmaceuticals & Biotechnology	AQ	
Rosneft	Oil & Gas	NR	
Royal Dutch Shell	Oil & Gas	DP	NP
RWE	Utilities	AQ	
SABMiller	Food, Beverage & Tobacco	AQ	
Saint-Gobain	Construction, Infrastructure & Real Estate	NR	
Samsung Electronics	Technology & Communications	DP	NP
Sanofi-Aventis	Pharmaceuticals & Biotechnology	AQ	NP
Sasol	Metals & Mining	AQ	

Company	Sector	Response status	Non-public
Schlumberger	Oil & Gas	DP	NP
Schneider Electric	Industrial & Manufacturing	NR	
Scottish & Southern Energy	Utilities	IN	NP
Seven & I Holding	Retail, Consumer Discretionary & Consumer Staples	AQ	
Shin Etsu Chemical	Chemicals	AQ	NP
Siemens	Industrial & Manufacturing	AQ	
Sime Darby Berhad	Industrial & Manufacturing	NR	
Snam Rete Gas	Utilities	AQ	
Sony Corporation	Technology & Communications	AQ	
Southern Copper Corporation	Metals & Mining	NR	
Southwestern Energy	Utilities	NR	
Staples	Retail, Consumer Discretionary & Consumer Staples	AQ	
Starbucks	Retail, Consumer Discretionary & Consumer Staples	AQ	
Statoil	Oil & Gas	NR	
Steel Authority of India	Metals & Mining	NR	
Sun Hung Kai Properties	Construction, Infrastructure & Real Estate	NR	
Suncor Energy	Oil & Gas	AQ	NP
Surgutneftgas	Oil & Gas	NR	
Syngenta International	Chemicals	AQ	
Sysco	Retail, Consumer Discretionary & Consumer Staples	NR	
Taiwan Semiconductor Manufacturing	Technology & Communications	AQ	
Takeda Pharmaceutical	Pharmaceuticals & Biotechnology	AQ	
Talisman Energy	Oil & Gas	NR	
Target	Retail, Consumer Discretionary & Consumer Staples	AQ	
Teck	Metals & Mining	NR	
Tenaris	Oil & Gas	NR	
Tepco (Tokyo Electric Power)	Utilities	NR	
Tesco	Retail, Consumer Discretionary & Consumer Staples	DP	NP
Teva Pharmaceutical Industries	Pharmaceuticals & Biotechnology	NR	
Texas Instruments	Technology & Communications	AQ	
The Southern Company	Utilities	IN	

Company	Sector	Response status	Non-public
ThyssenKrupp	Industrial & Manufacturing	AQ	NP
TJX Companies	Retail, Consumer Discretionary & Consumer Staples	NR	
Toshiba	Technology & Communications	AQ	
Total	Oil & Gas	DP	NP
Toyota Motor	Industrial & Manufacturing	AQ	NP
TransCanada Corporation	Oil & Gas	NR	
Transocean	Oil & Gas	NR	
Tullow Oil	Oil & Gas	NR	
Tyco International	Industrial & Manufacturing	AQ	NP
Unilever	Retail, Consumer Discretionary & Consumer Staples	AQ	
United Technologies Corporation	Industrial & Manufacturing	AQ	NP
Vale	Metals & Mining	DP	NP
Veolia Environnement	Utilities	DP	NP
Vinci	Construction, Infrastructure & Real Estate	NR	
Visa	Technology & Communications	NR	
Volkswagen	Industrial & Manufacturing	DP	NP
Walgreen Company	Retail, Consumer Discretionary & Consumer Staples	NR	
Wal-Mart de Mexico (see Wal-Mart Stores)	Retail, Consumer Discretionary & Consumer Staples	IN(SA)	
Wal-Mart Stores	Retail, Consumer Discretionary & Consumer Staples	IN	
Waste Management	Industrial & Manufacturing	AQ	
Wesfarmers	Retail, Consumer Discretionary & Consumer Staples	AQ	
Wharf Holdings	Construction, Infrastructure & Real Estate	NR	
Wilmar International	Food, Beverage & Tobacco	NR	
Woodside Petroleum	Oil & Gas	IN	NP
Woolworths	Retail, Consumer Discretionary & Consumer Staples	DP	
Xstrata	Metals & Mining	AQ	
XTO Energy	Oil & Gas	NR	
Yum! Brands	Retail, Consumer Discretionary & Consumer Staples	NR	

Key to table of response status and sector by company:

AQ	Answered questionnaire
SA	Company is a subsidiary. See company in brackets for further information on company's status
IN	Provided information
DP	Declined to participate
NP	Response not made publicly available
NR	No response

The following companies from outside the target sample of 302 responded on a purely voluntary basis:

Acciona
 Baxter International
 Biogen Idec
 ConAgra Foods
 Danisco
 Ecolab
 Eskom
 Essilor International
 Exxaro Resources
 HudBay Minerals
 Impala Platinum
 McCormick & Company
 Molson Coors Brewing Company
 Natura Cosmeticos
 Nedbank
 NH Hoteles
 Norsk Hydro
 Northam Platinum
 Owens Corning
 Penn West Energy Trust
 Pilgrims Pride
 Reed Elsevier
 Stanley Works
 Sulzer
 Woolworths Holdings

Lavish**Design and production**

Lavish is a leading Creative Services agency based in London. We specialise in the creation and management of brand assets and communication materials for clients in the corporate and not-for-profit sectors.

For more information on Lavish visit www.lavishconnect.com

Important Notice

The contents of this report may be used by anyone provided that acknowledgement is given to Carbon Disclosure Project. This does not represent a licence to repackage or resell any of the data reported to CDP and presented in this report. If you intend to do this, you need to obtain express permission from CDP before doing so.

ERM and CDP prepared the data and analysis in this report based on responses to the CDP Water Disclosure 2010 information request. ERM and CDP do not guarantee the accuracy or completeness of this information. ERM and CDP make no representation or warranty, express or implied, and accept no liability of any kind in relation to the report including concerning the fairness, accuracy, or completeness of the information and opinions contained herein. All opinions expressed herein by CDP and/or ERM are based on their judgment at the time of this report and are subject to change without notice due to economic, political, industry and firm-specific factors. Guest commentaries where included in this report reflect the views of their respective authors.

ERM and CDP and their affiliated member firms or companies, or their respective shareholders, members, partners, principals, directors, officers and/or employees, may have a position in the securities discussed herein. The securities mentioned in this document may not be eligible for sale in some states or countries, nor suitable for all types of investors; their value and the income they produce may fluctuate and/or be adversely affected by exchange rates.

'Environmental Resources Management Ltd' and 'ERM' refer to Environmental Resources Management Limited or, as the context requires, other member companies of the ERM Group of Companies.

'Carbon Disclosure Project' and 'CDP' refers to Carbon Disclosure Project, a United Kingdom company limited by guarantee, registered as a United Kingdom charity number 1122330.

Lead Sponsors



Project Sponsor



Founding Responders

Ford Motor Company, L'Oréal, Reed Elsevier

Our sincere thanks are extended to the following:

Individuals:

Barton Alexander, Brooke Barton, Magdalena Kettis, Claudia Kruse, Jason Morrison, Stuart Orr.

Organisations:

Bloomberg, Global Reporting Initiative, National Business Initiative (South Africa), Ogilvy Public Relations Worldwide, Pacific Institute, United Nations Global Compact, United Nations Principles for Responsible Investing, World Business Council for Sustainable Development, World Resources Institute, WWF.

CDP Contacts

Paul Dickinson
Executive Chairman

Paul Simpson
Chief Executive Officer

Marcus Norton
Head of CDP Water Disclosure

Chris Hedemann
Account Manager

Carbon Disclosure Project
40 Bowling Green Lane
London EC1R 0NE
United Kingdom
Tel: + 44 (0) 20 7970 5660
Fax: + 44 (0) 20 7691 7316
www.cdproject.net
water@cdproject.net

Report Writer Contacts

John Curtis
Partner, UK

Velislava Ivanova
Partner, US

Bryan Hartlin
Senior Consultant, UK

Alec Tang
Consultant, NZ

Tom Ferguson
Consultant, UK

Environmental Resources Management (ERM) Ltd.
2nd floor, Exchequer Court
33 St. Mary Axe
London EC3A 8AA
Tel: +44 20 3206 5200
Fax: +44 20 3206 5440
Emails: firstname.lastname@erm.com

CDP Board of Trustees

Chair: Robert Napier
The Met Office

Christoph Schröder
TVM Capital

Tessa Tennant
The Ice Organisation

Martin Wise
Relationship Capital Partners

Alan Brown
Schroders

Jeremy Smith
Berkeley Energy

James Cameron
Climate Change Capital

Takejiro Sueyoshi

Chris Page
Rockefeller Philanthropy
Advisors